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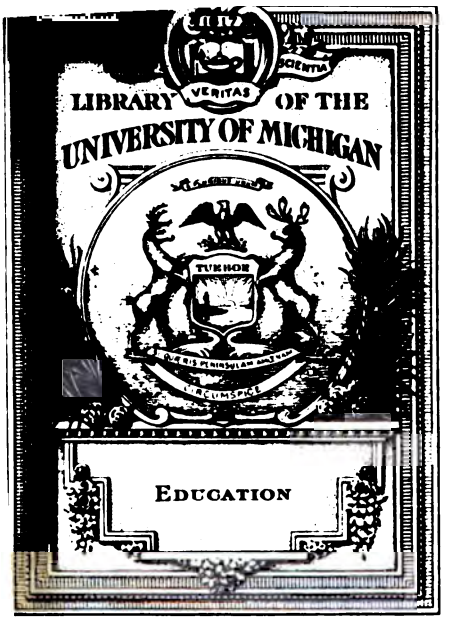
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THE PRINCIPLES OF EDUCATION

BY

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EDITOR'S PREFACE

DURING the later decades of the nineteenth century philosophy and psychology dominated the theory of education. From the principles of these two fields methods were deduced for which the claim was made that they produced the best results in instructional practice.

During the twentieth century, however, experimental science has been the dominant method. Without regard for the philosophical point of view, specific methods of teaching, of supervision, and of administration have been studied in localized situations to discover the better practice. During these two latter decades a very considerable body of technique has been collected and to this constant accretions are being made. The force of the scientific impulse is, fortunately, not yet expended and it is confidently expected to continue indefinitely with increasing value.

But since the tendency of science is to produce a body of technique, particle by particle, as investigators study small individual and relatively isolated problems, central attitudes and principles are temporarily ignored. The result of this is that the orientation of the whole mass of technique is lost sight of and those who practice do so without clear ultimate purposes in mind.

With some subjects, such as the physical sciences, this tendency takes care of itself but in those sciences which treat of mind and men, so many uncontrolled factors enter into the direction and execution of practice that some guiding objectives are necessary in the present incomplete condition of knowledge and, in all prob-

ability, will always be necessary no matter how far the scientific development of the field may be carried.

Moreover, the scientific attitude toward education which has substituted facts for opinions so satisfactorily in many cases, produces in the mind of the scientist and his followers a disesteem for philosophy. A fact is a fact, but a philosophical principle is an opinion and as such is treated as being neither trustworthy nor necessary. Consequently there is a distinct tendency among the less thoughtful educators at the present time to ignore principles of education.

If, however, we look upon philosophy as an activity of the human mind which seeks to take stock of what has been accomplished and to determine its meaning, to disentangle the important from the unimportant, and to set all the items in some perspective, it is evident that it has a very definite place in education.

Into such a conflict between a mental science with uncontrolled factors and scientific laboratory investigation wherein scant patience is frequently shown toward those who pause to get a perspective in the presence of a great body of unorganized facts, the appearance of this book, which deals with the principles of education, is timely. The author has accepted a point of view which he believes, and which to the editor appears to be, a useful interpretation of the tendencies of educational thought and effort in this generation, and has endeavored to organize the isolated facts and practices into an organic unit. It will not only help the college student to orient himself in the midst of the complexities of such an unorganized field but will also provide the investigator and college teacher with, at least, a point of departure in his thinking.

AUTHOR'S PREFACE

THIS book is the outgrowth of twelve years of classroom instruction, supplemented by other work in the training of teachers. It is an attempt to present with logical cogency a simple and definite system of principles for guiding educational thought and practice. Elaboration useless for this practical purpose has been avoided.

Attention should be called especially to two characteristics of this discussion of the principles of education. (1) Man is here regarded as a person who seeks to attain purposes through means of control and also as a psychophysical organism in a process of adjustment to environment through stimuli and responses; but these two points of view, the confusion of which has led to much erratic thinking in the field of education, have been kept distinct. (2) The importance in the educative process of the appreciation of values is here emphasized as much as is the importance of the knowledge of facts, by which appreciated values may be attained. In this connection, the essential nature and function of history and of literature and the other fine arts are explained, and the methods in accordance with which this subject matter should be taught are definitely presented.

Quotations used in this book are evidence of my indebtedness to various authors. I should acknowledge especial indebtedness to my former teachers, including Professors Paul H. Hanus, Hugo Münsterberg, and Josiah Royce at Harvard University; Professors John

Dewey, John Angus MacVannel, Frank M. McMurry, and Edward L. Thorndike at Teachers College, Columbia University; and Professor John P. Gordy at Ohio State University. My former colleague Professor W. W. Charters of the Carnegie Institute of Technology has read the entire manuscript and has made valuable suggestions for its improvement. Dean Frank Thilly of Cornell University and my colleagues Professors Max F. Meyer and George H. Sabine have given helpful criticisms of parts of the discussion. I am indebted to my colleagues Professors Frederick M. Tisdel and Robert M. Dewey, who have read the manuscript and are responsible for much improvement in the matter of expression. Acknowledgment is due my former colleague Dean Frank P. Graves of the University of Pennsylvania and his wife, Helen Wadsworth Graves, who have reviewed the proof of the entire book. Acknowledgment for helpful criticism of the manuscript and proof is due my wife, Edith Logan Coursault. A final indebtedness I owe to my parents, who encouraged me to prepare for the profession of teaching.

JESSE H. COURSAULT.

COLUMBIA, MISSOURI,
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SUGGESTIONS FOR USING THIS BOOK AS A TEXTBOOK

THIS book is adaptable to students in various stages of advancement. The student unacquainted with psychology may omit the sections in which the principles of education are discussed from the point of view of natural science and still find a complete connected account of these principles presented from the point of view to which he has been accustomed in everyday life. Other omissions that may be made in the case of students whose knowledge of education is very limited will be evident to the teacher.

The introductory chapter, which explains the purpose and plan of this book, is necessarily more abstract than are the subsequent chapters. As shown on pages 21 and 22, the systematic presentation of the principles of education begins with Chapter II. The student whose previous experience has not prepared him to understand fully the introductory chapter should, therefore, study it at first not for complete mastery, but for whatever insight into the purpose and plan of the subsequent discussion he can gain by the careful reading of it. After he has studied the rest of the book, he will be prepared to understand fully this chapter and should then re-read it.

Each chapter and section is prefaced by a brief statement of the essential ideas contained in it. At first the student should regard these statements tentatively as propositions to be explained and verified. After he has

read the discussion, he may regard them as the conclusions of the chapters or of the sections to which they belong.

A few references for further study[1] with comment upon each and a few problems for solution are given at the end of each chapter. The student himself should find other readings and problems; for when he has acquired the subject matter here presented, he should be able to recognize important discussions of principles of education as well as to review these discussions critically, and to recognize important educational problems as well as to apply the principles in solving them. Since one learns by doing, the importance of applying the principles in the criticism of educational thought and practice and in the solution of educational problems cannot be overestimated. Furthermore, the only adequate evidence that the student understands these principles is his ability to use them.

In order to be most useful to the student, the principles of education must be logically organized in his experience. For this reason the subject matter is here presented in logical form. It is desirable, however, that the teacher in using this book as a textbook do not follow too closely the logical order of topics. It would be well, for example, in teaching the chapter entitled *How New Purposes Are Made*,[2] to show briefly the application of the conclusions reached to the explanation of the nature of some poem or picture, such as the *Twenty-Third Psalm* or *The Slave Ship*,[3] and to the explanation of the method of teaching this poem or picture.[4] The principles developed in the chapter entitled *How New Means of Control Are Made*[5]

[1] For class work, it is desirable that one copy of each important reference book be reserved in the library for each four students in the class.

[2] Ch. IV.

[3] See pp. 219–221 and 230–231.

[4] See pp. 397–400, 402–404, and 404–406.

[5] Ch. V.

could likewise be connected with some of the important facts given in the discussion of the general nature of the sciences,[1] and in the discussion of the method of teaching control subject matter.[2] Such cross references would add to the practical interest of the student in the study of the principles and would help him to carry over the earlier formulations of principles to their applications when later he takes up systematically the study of these applications.

[1] Ch. IX. [2] See pp. 416–427.

THE PRINCIPLES OF EDUCATION

CHAPTER I

THE PURPOSE AND PLAN OF THIS BOOK

In educational thought and practice, there is need of guiding principles which conform to the truths established by modern science and philosophy. It is the purpose of this book to make these principles simple, definite, and clear. The truths established by science and philosophy are revealed from two points of view, — that of natural science, which describes and explains man in the light of physical causation as an organism responding to stimuli from the environment; and that of teleology, which regards him in the light of final causation as a person controlled by purposes and ideas. The principles of education derived from these two points of view may be made more easily available by reducing them to a single system through the translation of those derived from the point of view of natural science, which is more accurate, into the terms of teleology, which is easier. The method adopted here for presenting the principles of education is to analyze into its factors the process of human development which education is to control, and to find how these factors unite in doing their work.

I

Every student of education should critically revise, in the light of modern science and philosophy, the principles which guide his judgments of educational thought and practice.

The purpose of this book is to make simple, definite, and clear, a body of principles which should guide in educational thought and practice. Every student of

education has certain fundamental beliefs, or principles, which he uses as standards in judging the truth or falsity of educational ideas and practices, upon which, as an explanatory basis, he organizes his knowledge of educational matters, and in the light of which he sees new difficulties to be overcome and new problems to be solved. He may not be able to state these principles in systematic form; indeed, he may not even recognize them as principles. But he has them nevertheless. He must have them in order to know what else in education is worth while. To call them to mind, he need only consider such questions as whether the state should establish separate agricultural or trades schools; whether state aid to schools in poorer localities is just to taxpayers in wealthier localities; whether Latin, industrial arts, or some other subject matter should be included in the common school curriculum; what subjects in the curriculum should be elective and what subjects should be required; how science, history, or literature should be taught; to what extent "telling" should enter into teaching; what the values of interest and effort in school work are; whether there should be a difference between preparation for college and preparation for life. To deal intelligently with these educational problems, to deal intelligently with any educational problems, even where scientific measurement is made use of, one must have some fundamental ideas as to the nature of education and the part which education plays in the drama of life.

The ordinary source of these principles is a more or less faulty popular tradition. Many of them have grown up in the popular mind and have become embalmed in the common expressions of the language. From time to time they have appeared as new ideas, but with the pass-

ing of generations they became common habits of thought and now appear with the cloak of authority as "common sense." Just as people speak of the sun's "rising" and "setting" as if by its own motion, although for three hundred years science has taught differently, so they entertain with regard to the fundamentals of education many ideas that are antiquated and untrue. Indeed, even persons who have made some progress in the study of education are often handicapped by the inadequate popular ideas to which they have been accustomed since childhood and which are as much a part of their mental equipment as the language they speak. Among these popular fallacies, some of which are in conflict one with another, are the beliefs that our ideas of things in the external world are copies of the things themselves; that these copies are impressed upon the mind through the senses; that the mind is composed of general powers, or faculties, which can be developed by special exercise; that the chief aim of education is knowledge; that the most valuable effect of literature and music is refined pleasure; that the child's undirected interests are the only guides to what he should study; that the most valuable result of education is mental discipline and strength gained through effort in learning.

Because the principles of education are of such fundamental importance, and because the popular "common sense" beliefs are so often untrue, every student of education should revise critically his basic ideas of the subject and make them conform to the truths established by modern science and philosophy. Failure to do this abandons him to the fallacies of popular judgment in educational matters; it leaves him with an inadequate basis for explaining and organizing modern educational

truths, and consequently without easily available guides for educational practice; and it consigns him to the futile task of trying to solve false problems which arise in any attempt to carry out principles that are not true. Illustrations will make this statement plainer. The erroneous popular belief that literature is merely for refined pleasure would lead one to misjudge the importance of this subject in the course of study. The belief that ideas of things in the external world are copies of those things acquired through the senses would be an inadequate basis for explaining, and therefore an inadequate basis for organizing for use, the steps by which a person acquires knowledge through solving problems by means of hypotheses. The erroneous popular belief that the most valuable result of education is mental discipline and strength gained through effort in learning, and the conflicting, but equally erroneous, belief that the child's undirected interests are the only guides to what he should study, would lead respectively to the one-sided problems of what should be in the curriculum merely because it requires effort and furnishes discipline, and what should be in merely because it excites interest.

Special studies in the field of education, such as educational psychology, the theory of teaching, and school administration, as well as more general subject matter, such as ethics, sociology, biology, general psychology, history, logic, epistemology, and metaphysics, reveal valid principles of education. None of them, however, covers the whole field of education. Each reveals principles of education from a special angle. All are more or less isolated and lack that organization which includes all points of view, which comprehends all of the fundamental principles, and which closely unites them into a

logical system. To learn the fundamental truths of education through a direct, comprehensive, systematic study of them and thereby to satisfy a serious need for which other subject matter does not provide, — this is the essential reason for the study of the principles of education.

II

Since human development is explained in terms of both efficient and final causation, a simple basis for organising the principles of education is possible only when the principles of education revealed from these two points of view are reduced to a common denominator.

In seeking a simple basis on which to organize the principles of education for systematic study, we meet a difficulty in the fact that a human being may be regarded in two very different ways, and that various special studies of human life, whatever the minor differences among them may be, take one or the other of these general points of view. Since man has a body and is, therefore, a part of the physical world, such natural sciences as biology undertake to describe and explain his nature and behavior in a materialistic way as controlled by physical causes only; since he has a spirit and is, therefore, a free moral personality, teleological studies, such as logic, ethics, and history, regard him as controlled by purposes and ideas. A simple basis on which to organize the principles of education apparent from these two widely different points of view, which we shall explain more fully, is possible only if the principles can be reduced to a common denominator. In order to find this common denominator, this simple basis for bringing together and organizing educational principles, it will be necessary first to consider more fully the point of view of natural

science, which may be called physical, or materialistic, and the point of view of teleology, which may be called ethical, or idealistic.

III

Natural science describes and explains man as a psychophysical organism controlled by physical causation only, and accounts for purposes and ideas as mere accompaniments of changes in the brain, thus making the body appear to be master of the mind.

Natural science, since it is the science of the physical world, must base its explanations upon physical causes. This method of explanation is the only one that it ever uses, the only one that it knows anything about. Primitive man, with his superstitious belief in animism, attempted to explain changes in the physical world by attributing them to spiritual forces; the modern scientist — never! Imagine the futility of trying to convince a physicist that, when the throttle is open, the steam locomotive moves as the result of some spirit inherent in the mechanism! The physical structure of the locomotive and the physical conditions under which it is placed are sufficient for a complete explanation. These, in turn, are traced to their physical causes. The locomotive was produced by whirring machinery in the factory, and the machinery was the product of previous mechanical action. One condition for the movement of the engine is coal, which was made by physical forces geological ages ago. Indeed, every factor in the movement of the locomotive may be traced backward, theoretically at least, from physical effect to physical cause, until the chain of connection is lost in primeval chaos. Nowhere, absolutely nowhere, does natural science recognize a spirit link in this chain.

But did not men work in making the locomotive? Did they not with physical hands guide the iron and steel

through the machines and swing the hammers in assembling the parts? And did they not do this because they had desires to earn wages and to construct, and had ideas that guided their movements? According to the view of natural science, they did not do this because they had desires and ideas. Natural science cannot recognize feelings and ideas as having any part whatever in the causal chain. Conservation of energy, a fundamental assumption of science, forbids it, because force can be attributed with scientific accuracy to physical objects only. According to this assumption, the total amount of force in the universe is always the same; it never increases or diminishes. If this assumption is true, energy, when not manifesting itself, must be considered as latent, or stored away. For example, when a clock spring is wound, energy is stored in it to be given off gradually in the running of the clock during the flight of hours. When a wagon is drawn up hill, the force applied to it that is not turned into heat by the friction of the running parts, is stored up in it and is given out again when the wagon runs down hill. Energy from the sun is stored in the coal and may be released to warm our houses, cook our food, or run our factories. But how could energy be stored in a mere idea or feeling, neither of which has a body or, except during its momentary appearance in consciousness, even exists? When the workman is asleep, when on a holiday he is thinking about social pleasures, the ideas and feelings that appear in the factory are not in his consciousness; they do not exist. How, then, could there be stored in them forces which contribute to the construction of the locomotive? How could there be stored in them the force necessary even to modify the engineer's brain and nerves so as to make his muscles

open the throttle, when the locomotive, under a full head of steam, is ready to run? According to natural science, so long as it holds to the fundamental assumption of the conservation of energy, purposes and ideas cannot have even an infinitesimal amount of force; they cannot add to or in any way change physical forces.

It is true that feelings and ideas may with correctness be spoken of as causes of physical actions. We may say that a man eats because he feels hungry or because he has the idea of strengthening his body. But in this case the materialistic point of view is not taken, and physical, or efficient, cause is not meant. What is meant is explained in the discussion of the teleological view of man. So far as natural science is concerned, to speak of feelings and ideas as causes of physical action is to use a metaphor that has no foundation in fact. The idea of the locomotive and the warmth of constructive interest, according to the explanation of natural science, can no more cause movements of the physical body of the workman than a bright idea can reflect sunshine into the factory, sharp wit cut the tempered steel, or the heat of desire kindle the forge.

Since man's body is a part of the physical world, natural science has a right to explain his actions in its own way as the result of physical causes. Just as the movements of the locomotive are considered the result of its structure and of the physical environment, such as coal, air, and water, acting upon it, so the actions of man, whether they be breathing, walking, painting a picture, or composing a poem, may be explained as the result of his bodily structure and of the stimuli coming from its physical environment. And just as the structure of the locomotive is the result of physical causes, so the structure of the human being is the result of physical heredity, variation, and

natural selection in the great factory of the material world.

Natural science, equipped with its materialistic methods of description and explanation, did not stop with the conquest of the physical world. Flushed with victory in this conquest, it invaded the realm of mind and attempted to explain the nature of consciousness. But here, at the very outset, it met a serious difficulty, because natural science was developed to explain the physical world and knows of no basis for explanation except physical causation. Since, as has been shown, physical energy cannot be stored in ideas and feelings, the mind is not subject to the kind of causal relations to which natural science is limited in its explanations. A way to overcome this difficulty, however, was invented. It was known that lesions in the brain are accompanied by changes in the character of consciousness, that certain drugs taken into the body affect the ideas and feelings, that stimuli applied to nerves leading to the brain are followed by corresponding sensations. These and many other similar facts were made the basis for the assumption that every mental change is paralleled by a corresponding physical change in the brain. This assumption, which is called *psychophysical parallelism*, opened the way for natural science in the explanation and control of mental life. If every idea and feeling is chained in some mysterious way to a physical partner in the brain, natural science, although it cannot lay hands directly upon ideas and feelings, can do what is for practical purposes the same thing; it can substitute for the direct explanation of ideas and feelings an explanation of the physical partners which they invariably accompany. It can account for the sensation of light as the accompaniment of the stimulation of certain

brain cells, through the medium of the optic nerve, and for the variation in the intensity of the sensation as the accompaniment of the variation in the intensity of the stimulation; it can account for the consciousness of a purpose as the accompaniment of a check in some habitual reaction to stimuli. We can find here an analogy between the way of controlling the feelings and ideas of a man and the way of controlling the music of a piano. The music itself is intangible, but accompanies the vibrations of the strings, which can be controlled by means of the physical keys. So with the intangible ideas and feelings of a man; they accompany the brain processes which can be controlled by means of the physical sense organs.

Although a natural science must logically explain mental changes indirectly through explaining physical changes in the brain, these physical changes need not be known directly through microscopic or other examination. It may be assumed that the changes which cannot be observed are like those which, in the physical world, take place on so large a scale that they can be observed. Natural science often makes use of such analogies where direct observation fails. Nobody, for instance, ever saw an atom or a molecule, but explanations of chemistry are, with scientific accuracy, based upon the actions of these analogical constructs. Nobody ever saw ether, but this does not in the least interfere with the value of the physicist's explanation of the transmission of light. Other kinds of waves have been seen, and the ether waves may be imagined to be like these. So in the explanation of the physical counterparts of mental facts, the natural scientist may assume that the changes, where he cannot see them, resemble those which he has seen elsewhere in the physical world; and thus, if his assumptions are

consistent with the facts so far as the facts are known, he may rest assured that in making these assumptions he has not compromised the dignity of natural science.

When the ideas and feelings of the mental world are accounted for materialistically as the associates, or parallels, of changes in the physical brain, sensations are explained as the accompaniments of brain changes started by physical action upon the in-going nerves; original desires are viewed as the accompaniments of checks in the expressions of instincts, or inborn nervous connections, created through a long process of interaction between organisms and environment, and conserved by heredity; and acquired desires are similarly explained as the accompaniments of checks in the functioning of nervous connections made, according to the laws of habit formation, in the lifetime of the organism. So, too, a vivid memory of an experience is accounted for as going hand in hand with a deep impression upon the brain; the association of ideas is regarded as the parallel of a path in the brain; and the emotions are explained as due to bodily conditions affecting the brain through the nervous system. The meanings of ideas are likewise said to be the parallels of brain changes produced by reaction in the adjustment of the physical body to its environment; growth of mental life is considered the accompaniment of changes in the brain resulting from continued interaction of organism and environment through stimuli and responses; and the fact that one can learn more easily in youth than in old age is attributed to the plasticity of the brain during youth. Thus is natural law made to rule in the spiritual world, to the end that man may get scientific control of his thoughts and feelings, and in this way control the behavior which they indicate.

IV

Teleologically man is regarded as a person controlled by purposes and ideas, the mind thus appearing to be master of the body. Purposes and ideas are directly interconnected through final causation by bonds of meaning.

When man is regarded as an essentially spiritual being, his conduct is no longer the result of blind force exerted through physical interaction which modifies the brain, but is rather the result of purposes which he has in mind and ideas which guide him in carrying out these purposes. In order to explain his action, we seek to find what he is trying to do and how he is trying to do it. We acknowledge him to be a person having inner experiences, and seek to understand his actions by reproducing in our imagination his feelings and thoughts, his purposes and ideas. The physical body is not regarded as the basis for describing and explaining his thoughts and feelings, but as an instrument under the control of his mind and used by his mind to accomplish its purposes. Instead of being master of the spiritual life, the body now becomes its servant.

Here, from this point of view, to be sure, purposes and ideas are considered the causes of action. A man's purpose to write a letter is the cause for his walking to the typewriter; his idea that oil makes a machine run more easily is the cause for his putting oil on the bearings. These causes are not, however, the kind recognized by natural science. In the case of natural science, the cause, which is physical, is a real thing preceding an effect. A billiard ball, for instance, must move before by impact it can move another ball. This kind of cause is called *efficient*. In the case of teleological explanations, where purposes and ideas are said to be the causes, the cause is

not a real thing until the effect is complete, until the *end* of the action. For this reason it is called a *final* cause. A man, for example, is running towards a moving car. What makes him run is the purpose of getting a seat in the car and the idea that he can do this by running, but he does not get the seat until the running is ended. In accounting from the teleological point of view for the appearance of purposes and ideas, no reference whatever to their physical counterparts in the brain is needed; they are interconnected and controlled by meanings which we can directly experience when they appear in our consciousness. This is the common way of regarding persons in our daily relations with them. With no thought of brain changes, we can reproduce in our imagination and thereby directly understand and appreciate the man's purpose of getting a seat in the moving car, and we can understand in connection with this purpose the meaning of the man's running.

V

In order to take advantage of the stronger features of both materialistic and teleological points of view, in reducing the principles of education to a single basis for organisation, principles derived from natural science, which within certain limitations is more accurate and authoritative, should be translated into the more familiar and more easily understood terms of teleology.

The two general ways in which human life is viewed have now been set forth. One uses as the basis for its explanations blind force transmitted through physical interaction, or, in other words, efficient causation; the other uses as the basis for its explanations purposes to be attained, or, in other words, final causation. The vistas of causation revealed from these two general points of

view lie in opposite directions. The one looks towards the past, retracing the chain of physical cause and effect until it is led ultimately to the forces emanating from primeval chaos; the other looks towards the future, accounting for each purpose by one farther ahead, until it is led ultimately in the explanation of things to that "one, far-off, divine event to which the whole creation moves." Our next problem is to find how these two general points of view may be related so that the principles of education learned from the various special studies which represent them may be unified.

Since only the realm of mind and the realm of matter are known,[1] the idealistic and the materialistic are the only points of view which studies of human life may take; there is no other point of view which includes the two and could bear the burden of reconciliation. The problem of reconciliation becomes, therefore, the problem of translating truths learned from one of these points of view into the terms of the other. In undertaking this task, the first question that arises is: Into which set of terms, the materialistic or the teleological, should the translation be made and the educational principles collected for organization?

In the statements of the principles of education, as an examination of textbooks in this subject reveals, a decided preference has been shown for the language and technique of natural science. This preference has been shown because natural science speaks with accuracy and authority. It can speak thus, because the things with which it deals, stimuli and reactions through the medium

[1] For those interested in metaphysics, it may be said that this statement is not intended to imply metaphysical dualism, since mind and matter are mere abstractions from a unitary experience.

of the brain, are manifestations of physical things known in common by all observers, either directly or through analogy with other things which are known directly, and which can be analyzed, accurately measured, and reduced to a mathematical basis. Experimental psychology furnishes abundant illustrations of this. On the other hand, from the point of view of teleology, the relations of thoughts and feelings can be determined only by the rule-of-thumb method of trying them in one's own mind, because they are connected by bonds of meaning, which can be understood only by being felt, and because the price paid for individuality is that one can feel only the content of his own mind and can never become directly conscious of that which is in the mind of another. The public speaker, for example, tries his arguments upon himself to determine what effect they will have upon his audience; the writer of advertisements imagines himself in the place of his readers and includes in the advertisement the ideas that would have the desired effect upon him; the teacher sympathetically puts himself in the place of his pupils, tries his lesson plan in imagination, and thus judges from what takes place in his mind what experience his pupils will have. Yet, although in general this method is practically valuable, as the successful efforts of orators, advertisers, and teachers who use it bear witness, the address may not lead to the convictions intended, the advertisement may not excite a desire for the articles offered for sale, and the ideas and feelings which the pupils do actually get may differ from the ones expected. Indeed, those who use this rule-of-thumb method may differ one from another in their conclusions. It is to overcome just such difficulties as these that natural science has been called upon

to adapt its accurate and authoritative methods to the realm of mind. In the psychological laboratory, mechanical descriptions and explanations, objective measurements and mathematical technique have begun to replace with scientifically tested truths the inaccurate and conflicting opinions which individuals have formed about mental phenomena by examining subjectively their own experience.

Compared with that of natural science, the teleological way of regarding people has the advantage of being easier to use. It is the common way of everyday life, used by children as well as by grown-ups, by the illiterate as well as by the most learned. But although a little child can know meaningful connections between thoughts and feelings, many a university student finds difficulty in understanding the efficient causal connections paralleling these mental phenomena, when the mind is regarded from the point of view of natural science; and although an ignorant beggar may control the ideas and feelings of another person regarded teleologically so as to get food and clothing, the most capable psychologists are still puzzled with regard to the materialistic explanation of this persuasion. Indeed, the contrast need not be so marked. How many teachers now in our schools would have been excluded from educational work if there were no simpler guide for teaching than the principles of biology and psychophysics!

Each point of view, therefore, is found to be strong where the other is weak. In order to take advantage of the strong features of each, it is necessary to translate the accurate and authoritative educational principles of natural science into the familiar language of the teleological view of life, so that these principles can be understood and used more easily.

But this is not all. The point of view of teleology has further claim to be the basis for the unification of the principles of education; namely, that it is more comprehensive and more fundamental than that of natural science.

In the case of primitive man, the teleological view alone was taken. Tribes separated by mountain and ocean all believed in animism, which represents the actions of things as controlled by final rather than by efficient causation. When, after many centuries, natural science became triumphant in the physical world, it began a conquest of the mind; but, although it has made rapid progress and notable achievement in explaining the spiritual world according to natural law, this work has only begun, and where it has not advanced, we are still dependent for guidance upon the teleological view alone. For this reason, psychology, which first came to its conclusions through introspection and which has since substituted psychophysical for teleological explanations, has now taken on a hybrid character. In view of these facts, it is evident that, owing to the youth of the latter, idealism has a broader vision than natural science.

But even when natural science has come into its own, it will not be able to catch all things in experience with its net of physical description and explanation. It was called into existence in the service of man's purposes understood and appreciated, not mechanically explained; it will always remain in this service. The scientist never makes any investigation except when led to do so by some purpose. Science has no value and cannot even be defined without reference to the purpose which it serves. Its expression in book and lecture is addressed to man regarded teleologically. However mechanical human life

may be made to appear, the fact still remains that purpose teleologically felt, not mechanically explained, is the pillar of cloud by day and the pillar of fire by night that leads natural science through the wilderness of investigation and gives value and meaning to its activities.

In the most intimate and fundamental relations of life, moreover, our fathers and mothers, our brothers and sisters, our friends and our enemies are not looked upon, will never be looked upon, as mere psychophysical organisms, the products of heredity, variation, and natural selection, fated to a continuous adjustment to environment through stimuli and responses. They are acknowledged, and always will be acknowledged, as persons who have feelings of ideal values, in the light of which they affirm and deny, choose and reject, like and dislike, love and hate. There is something more significant in the mother's love for her child and in the holy aspiration of the saint than can be revealed by accounting for these emotions as we account for squirming when one is tickled and gasping when one is hit in the stomach. This deeper significance is revealed only from the teleological point of view, through sympathetic understanding and appreciation in terms of one's own experience. So long as a halo of worth is worn by love and duty, so long, indeed, as any value whatever remains in life, the language of natural science will never be the language in which man expresses his deepest convictions. It is not an accident that the great religions recognize a divine purpose in the universe; it is not an accident that the great philosophies are idealistic.

VI

The method here adopted for presenting the principles of education in a systematic form is to analyze into its factors the process of human development, which education is to control, and to find how these factors unite in doing their work, the teleological view being given first and then supported by natural science.

Before undertaking to present the principles of education in terms of the language of teleology, one more problem must be solved. A plan of procedure, a method of organization, must be found which will present these principles in the most economical and effective way.

Since ideas come into the mind when they are called for in the solution of problems, it is desirable to get a series of problems which will bring the principles of education to mind in a systematic way. The best series of problems is undoubtedly that which appears when one follows the steps ordinarily taken in the investigation of any complex thing. When a youth successfully investigates the nature of a mechanical toy, he takes the toy apart and puts it together again; to understand the constitution of the material world, the chemist has separated material objects into their chemical elements, and then has found and stated as laws the uniform ways in which these elements unite to make the objects; to understand the nature of language, the grammarian has analyzed language into the elementary parts of speech and then has discovered and stated as rules of grammar the uniform ways in which these parts of speech combine; to understand our institutions, the historian seeks through historical analysis to find the purposes which gave rise to them and the way in which these purposes and the solutions of attendant problems have combined to make them what they are. Analysis and synthesis are the steps that

mark the problems through which one proceeds ordinarily in his investigations.

Since education is an important factor in the process of human development, and since the principles of education are the principles which control this process, the best plan of procedure in getting the principles of education in a systematic form is to analyze the process of human development into its elementary factors and then to find how these factors unite in doing their work.

In making this analysis, the larger factors, which are themselves complex processes, will naturally be distinguished first; and then, in turn, these will be analyzed into the simpler factors of which they are composed. It is to be expected, therefore, that the first ideas presented will of necessity be general in nature and not sharply defined in content; but, as the analysis proceeds and becomes more specific by reducing more complex processes into the simpler factors of which they are composed, these ideas will become more sharply defined in content and correspondingly more definite and clear.

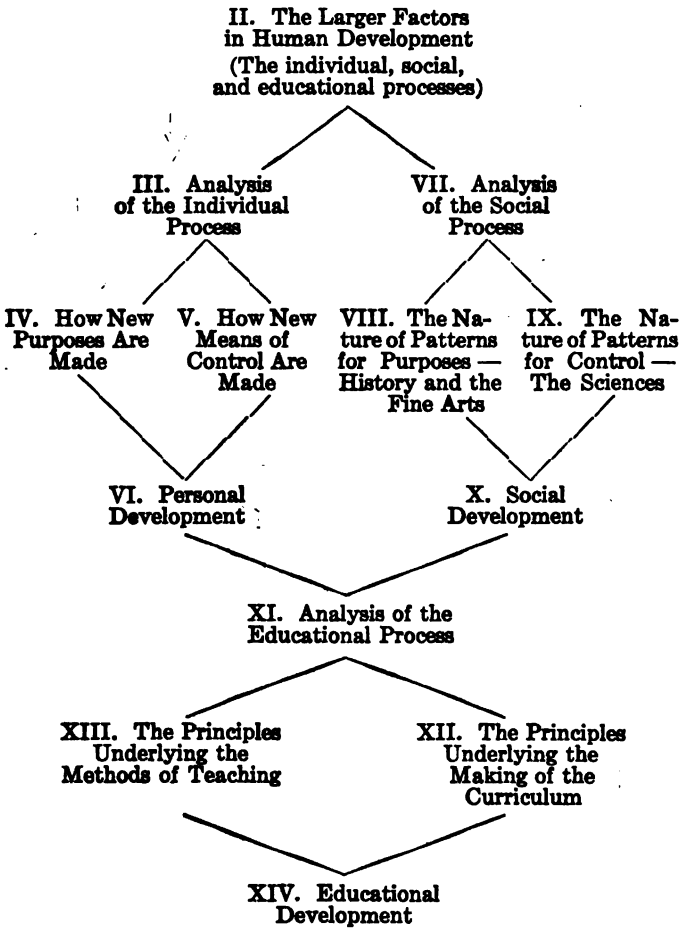
In order to avoid a confusion of the two points of view from which human development may be studied, the principles, in the case of each larger problem, will first be presented from the teleological point of view, and will then be supported by the conclusions of natural science.

Because of the incompleteness of thoroughly-tested materialistic explanations of experience, an incompleteness due to the newness of this venture, materialistic explanations given in this book must often go beyond the bounds of verified fact and depend for authority upon analogical reasoning. When the narrow limits of verified facts have been reached, the only further evidence available from the point of view of natural science must be

based upon certain similarities that have been proved to exist between the brain and other physical things of which we have a better understanding. Knowing, for instance, that in some fundamental particulars the brain is like a "telephonic switchboard" or "interrelated channels," we are well justified in assuming that probably this similarity extends to other particulars. Conclusions reached by analogical reasoning have, therefore, some authority; and the use of them is justifiable in securing from the materialistic point of view evidence corroborative of conclusions reached from the teleological point of view. They should be accepted, however, only tentatively, because scientific investigation at some future time may invalidate the arguments upon which such conclusions have been based.

ORGANIZATION OF CHAPTERS

The organization of the subsequent chapters of this book is graphically represented on page 22. Human development is analyzed into three processes, — the individual, the social, and the educational. The discussions of these three processes constitute the three main divisions of this book. The individual process is analyzed into its factors, purposes and means of control, which combine in making personal development. The social process is analyzed into its factors, the patterns for purposes and the patterns for means of control, which combine in making social development. The educational process, which unites the individual and the social processes, is analyzed into its factors, the making of the curriculum and the methods of teaching, which combine in making educational development. The Roman numerals indicate the respective chapters in which the several topics are discussed.



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PROBLEMS

1. Answer the questions on page 2 and indicate in each case the general principle you have assumed in answering the question. (For example, if you say that Latin should not be taught in the common

schools because it is not practical, you assume as a principle that all subject matter taught in such schools should be practical.)

2. *a.* Do you hold any belief specified on page 3 as erroneous? *b.* If so, how did you acquire this belief?

3. *a.* Make a list of five acts you do habitually and indicate in each case the stimulus and response. *b.* Indicate in each case the purpose of the act. *c.* Distinguish between the two points of view from which you have regarded yourself in this exercise.

4. Select from the books noted above as references for class reading five statements that represent the materialistic point of view and five statements that represent the point of view of teleology.

5. Show how a small amount of scientific experimentation proved authoritatively the fallacy in the doctrine of formal discipline as accepted for centuries by educational thinkers who did not use this method of investigation.

6. From the point of view of natural science, does a man appear to be morally free in choosing what he will do?

7. What is the best reason you can give for believing that, with reference to man, the point of view of teleology is more fundamental than the point of view of natural science?

CHAPTER II

THE LARGER FACTORS IN HUMAN DEVELOPMENT

The larger factors in human development are (1) the social factor, which determines the purposes and ideas available for controlling conduct; (2) the individual factor, in which these purposes and ideas are realized; and (3) the educational factor, which unites the other two by providing conditions favorable to the development of social purposes and ideas in the individual life.

I

The social and individual factors are revealed superficially through opposition between them.

"Civilized man is born, lives, and dies in a state of slavery; at his birth he is sewed up in swaddling clothes, and at his death he is nailed in a coffin; so long as he preserves the human form, he is fettered by various institutions." This extreme statement by Rousseau, provoked by conditions preceding the French Revolution, calls attention to the individual and the social factors in human development by showing them in opposition to each other. Since the dramatic element of strife commands attention, the prevalent ideas of these factors have been developed largely out of opposition between them. The maxim "Spare the rod and spoil the child," would make it appear that the individual should be whipped into lines of activity approved by society. The business man who violates the generally accepted ideas of fair dealing and the husband whose treatment of his family does not accord with his

neighbors' standards of kindness, are made to feel the indignation of the community. Because not controlled by ideas commonly accepted, the polygamist is imprisoned and the murderer is put to death. Socrates, accused of denying the gods recognized by the state and of teaching the youth ideas which Athenians generally did not accept, was compelled to drink the fatal hemlock. Giordano Bruno asserted that the world moves, and a society with whose fundamental beliefs this idea conflicted burned him at the stake; while, shortly afterwards, Galileo also would have been sacrificed on the altar of social regulation, had he not recanted a similar belief. John Huss suffered martyrdom for his religious ideas and Martin Luther probably escaped a similar fate by concealment in the castle of Wartburg. Truly did the three crosses on Calvary symbolize the fact that both the reformer and the criminal are transgressors of social beliefs and customs, and that, in exercising a regulative influence to enforce its own standards, society has made the way of the transgressor hard.

II

The social factor determines the purposes and ideas essential to the development of men; this social regulation varies in different groups at the same time and in the same group at different times; and the story of the changes of this social regulation is the history of civilization.

In the contrast between the individual and society made apparent by such instances as those noted above, society seems to regulate in an arbitrary way the ideas and purposes of the individual; it seems artificially to impose man-made restrictions upon him. Rousseau expresses this idea very well in his "social contract" theory, which holds that men, having lived only as inde-

pendent individuals, made a contract to live together as a society, because they saw that selfish advantages could thereby be gained. A ruler was then provided for and the machinery of state established to enforce the regulations of the contract upon those who would seek to evade them.

By placing authority thus with the masses and by making the king and his officers appear to be merely agents of the masses in enforcing the social contract, Rousseau's theory exercised a strong influence in overcoming the belief in the divine right of kings. In this way it played a prominent part in opening the floodgates of human passion so that outgrown and pernicious social regulations were swept away in the French Revolution. But however valuable these results may have been, Rousseau's theory of the nature of the social factor in human development is superficial.

Man, to translate the words of Aristotle, is a "social animal." Indeed, even lower animals, down to the bees and the ants, have forms of social organization, though they certainly know nothing about contracts and do not understand that advantages come from social organization. A human being becomes a member of society for the same reason that he breathes air and eats food, — it is his nature to do so. Development of the purposes and ideas which control his conduct is as much dependent upon life in society as his physical development is dependent upon air and food. Every worthy purpose and every valuable idea which the individual acquires is social in its origin and is acquired by him from society. Indeed, the idea of a contract, the ideas of advantages coming from social organization, although assumed by the "social contract" theory to antedate social relations, would

never have been known, had not man been living a social life for countless generations. As Professor Baldwin says: "Man is not a person who stands up in his isolated majesty, meanness, passion, or humility, and sees, hits, worships, fights, or overcomes, another man, who does the opposite things to him, each preserving his isolated majesty, meanness, passion, humility, all the while, so that he can be considered a 'unit' for the compounding processes of social speculation. On the contrary, *a man is a social outcome rather than a social unit.* He is always, in his greatest part, also someone else. Social acts of his — that is, acts which may not prove anti-social — are his *because they are society's first;* otherwise he would not have learned them nor have had any tendency to do them. Everything that he learns is copied, reproduced, assimilated, from his fellows; and what all of them, including him, — all the social fellows, — do and think, they do and think because they have each been through the same course of copying, reproducing, assimilating, that he has." [1]

In the light of this explanation of man as a "social animal," it becomes evident that the headsman's axe and the hangman's noose, the prison and the whipping post, and popular disapproval and indignation, are incidental in social regulation. For the most part, since it is his nature to do so, the individual willingly acquires from society the purposes and ideas that control his action. He cannot get in any other way the purposes and ideas that are necessary to satisfy his own needs and to promote his own personal development. Only after thousands of generations of coöperative struggle has

[1] Baldwin, James Mark, *Social and Ethical Interpretations*, 1906, p. 96.

society attained these purposes and ideas; they have been bought with the sweat and blood of centuries. But they are free to the individual for the taking. If he were denied the advantage of this vicarious struggle of society, his puny mind and short life span would make personal development impossible. Without this social inheritance he could never be a man.

Different nations at the same time and the same nations at different times have varied greatly in their accumulated store of purposes and ideas available to individuals within the social group. In this respect, the Spartans differed from the Athenians, the Germans from the French, and the subjects of Queen Elizabeth from those of George V. Volumes have been filled with records of the important changes which the Roman invasion brought about in the purposes and ideas of western Europe, and within a half century Japanese purposes and ideas have been remade.

The history of civilization is but the record of the changes in social regulation brought about by the development of new purposes and ideas which control men's conduct. In primitive times, human beings under social guidance found their highest satisfaction in the mere gaining of food, shelter, and protection against enemies, used the crudest of tools, saw spirit doubles in stones and trees, and regarded fire with superstitious awe. When the forces of nature were harnessed, and, with the use of fire, better tools were made, when habitations became settled and division of labor more complex, individuals were brought to the realization of higher, more complex purposes and ideas. In the Western World, the religious development of the Hebrews, the literary, artistic, and philosophical development of the Greeks, and the

institutional development of the Romans made further changes in the kind of regulation effected by society. Though men have come and men have gone, the character of social regulation has continued to develop through the making of new purposes and ideas to the present age with its industrial factories and governmental institutions, its schools, libraries, art galleries, and churches.

III

The individual factor is the medium in which purposes and ideas are produced under social guidance, but individuals vary greatly in their abilities to profit by this guidance.

What is the nature of the individual factor in human development? If, under conditions in which only the individual and the social factors are involved, we can in imagination take away the social, we have left the individual factor alone. For example, the human being known as Martin Luther may be imagined to have grown up in civilizations different from that in which he actually lived. If he had grown up among the Chinese, he would have eaten with chop sticks, and, having grown a cue, would have felt humiliation at the thought of losing it. Also, he would have thought in the Chinese language, understood only primitive methods of agriculture, if any, and would have entertained oriental religious ideas. In Athens at the time of Pericles, in Rome at the time of Cæsar Augustus, in France at the time of the Crusades, he would have had different purposes and ideas, and therefore would have acted differently. That which would have been present in Luther under one civilization and not under another is obviously social in its nature, since it would have depended entirely upon the society

in which he lived; that which would have been present in him under any civilization is obviously individual in its nature, since it would not have depended upon the society in which he lived. Eliminating, then, the purposes and ideas which he might have acquired in any particular civilization, there is left a being capable of producing purposes and ideas in accordance with patterns set by society. The individual as thus distinguished is the factor through which purposes and ideas are produced under social guidance. In this way, the individual is seen to be the agent through which society functions, the medium in which social purposes and ideas are realized.

Individuals vary greatly in their abilities to appropriate social purposes and ideas by reproducing them in their own experience and thus making them guides for conduct. Idiots and insane persons are largely wanting in this ability, whereas geniuses possess it to a conspicuous degree. Some individuals, furthermore, are more capable of appropriating social purposes and ideas in one field than in another. Consequently, one excels in manual arts, commerce, or politics, while another excels in science, music, or religion. The individuals of one race may differ from those of another in the ability to appropriate social purposes and ideas.

IV

An understanding of both the social and the individual factors, although they are abstractions, is necessary to the control of human development.

The individual and society are two abstractions; *i.e.* things that can be separated in imagination, but not in reality, as in the case of whiteness and the substance

which is white. There can be no society without individual human beings, and there can be no individual human beings without society. Even when some anchorite monk retires to his solitary life in the desert and when some Robinson Crusoe is lost on a far-away island, they cannot get rid of the social factor in experience, but take with them purposes and ideas which, before their isolation, they got from society and could never have acquired in any other way.

Although the social and the individual factors are known only as abstractions, the recognition of both of them is essential to the understanding and control of human development, and has, therefore, important practical consequences. The law of gravitation, too, is an abstraction; but the builder of air ships who neglects it is bound to meet failure or even disaster in the world of practical affairs.

Two illustrations may be given which show serious consequences in the control of human development that have come from a failure to recognize the full importance of one or the other of these factors.

V

The neglect of the individual factor, as exemplified in the thought of Plato, led to a separation of theory and practice, which retarded human development.

In his study of human nature, Plato neglected the individual factor in human development. He lived at a time when loss of faith in social tradition had in a conspicuous measure abandoned men to the guidance of undisciplined and capricious individual desires. Disintegration of the state and degeneration of the individual were resulting. Some authoritative regulator of human

action was needed. Under such conditions, it was a very natural mistake for Plato, in seeking this, to turn from a direct study of the more or less undisciplined, capricious, and therefore chaotic nature of the individual, and to center his attention upon only the regulative or social factor in human life.

Plato said that the nature of the individual appeared to be so small and intricate that direct study of it was difficult. With the thought that one who sees something written in large letters can afterwards read more easily the same thing written in small letters, because he knows what to look for, Plato assumed that society is the individual written large; and that by studying the nature of society, he could read in big letters the nature of the individual man. Thus he failed to make a direct study of the individual process and based his understanding of human nature upon the study of the social factor alone.

The study of the social factor does not reveal how ideas come into being. This is true, because, as we have learned, the process for making ideas in accordance with social patterns is peculiarly individual; the individual is the agent through which society functions, the medium in which social purposes and ideas are realized. Plato could not, therefore, understand how ideas are made; and, not understanding this, he naturally assumed that they were not made at all, but always existed. Having decided that ideas are eternal, he found an easy step to the conclusion that eternal ideas are more valuable than the changing, perishing things of the world, and consequently that in order to secure the highest development, man should turn away from temporal things of the world and look with the "eye of the soul" upon eternal ideas.

This conclusion means that ideas are purer and more divine in nature in the degree that they are free from connection with the temporal practical affairs of life, which are supposed to contaminate them. According to Plato's philosophy, the highest development of men required, therefore, that they live as much as possible in a realm of pure abstract thought rather than in the world of practical action. The heavenly halos of these ideas, as seen in his poetic fancy, had blinded him to the importance of the very world of practical affairs in which, as shown above, his problem originated. In a word, because Plato, through a failure to find the true nature of the individual process, failed to understand how ideas are actually made, he was led logically to separate the realm of thought from the world of practical action; or, to state it more briefly, to separate theory and practice.

Plato believed, it is true, that ideas should control the practical affairs of life, but he separated ideas from these affairs by attributing to them (1) a noble origin independent of the practical world, and (2) an intrinsic value that made the pursuit of them preëminently worth while, apart from their practical application. He says that the ideal men, the philosophers, who have been trained by years of abstract thinking, "must be constrained to lift up the eye of the soul, and fix it upon that which gives light to all things; and having surveyed the essence of good, they must take it as a pattern, to be copied in that work of regulating their country and their fellow-citizens and themselves, which is to occupy each in turn during the rest of life; — and though they are to pass most of their time in philosophical pursuits, yet each, when his turn comes, is to devote himself to the hard duties of public life, and hold office for his

country's sake, not as a desirable, but as an unavoidable, occupation." [1]

Plato's theory of the origin of ideas would lead thought to commit suicide; for, as we shall see later, the very ideas upon which thought feeds are not gifts from heaven, but are worked out by human beings in the solution of problems created by difficulties in the practical life. Without the practical, changing world with its difficulties and consequent problems, there would be no ideas and thought would perish.

Let Plato's emphasis upon the value of thought for its own sake, an emphasis mistaken because the direct study of the individual was neglected, be tested by the effect which the ideal of mere theoretical study has had upon human development. Only a few conspicuous examples need be mentioned. Descendants of virile Greeks who helped to save Europe from oriental invasion ignored great vital problems upon the solution of which human advancement depended, and consumed their time in quibbles over formal doctrines in the philosophical schools. When all western Europe was crying out for guidance to escape superstition, injustice, crime, poverty, and disease, thousands of the most capable men were turned from the study demanded by the best interests of humanity and were led to devote their lives to a vain attempt to get nourishment from the dry husks of scholasticism, long after the juices had been extracted. Even to-day, the school, which should start the individual aright in this practical world, is tending too much to force the pupil, distracted by effort, to seek knowledge merely for its own sake. When such is the case, the pupil, as we shall explain definitely later, does not get

[1] Plato, *The Republic*, Bk. VII.

the true meanings and values of the facts learned, because he does not recognize the practical service of these facts in human life. Verily, whenever thought is separated from practice, thought itself loses both its true meaning and its true worth.

A general estimate of the value of Plato's influence should not be based merely upon the mistake he made by not giving adequate recognition to the individual factor in experience. His name, as we shall explain later, is written large in the history of the development of civilization.[1]

Our purpose here is only to see that the individual factor must be taken into consideration in getting a true understanding of the nature of human development; and that, if this is neglected, the consequences may be serious.

VI

The neglect of the social factor, as exemplified in the thought of Rousseau, led to making caprice the guide of conduct.

Many centuries after Plato, Rousseau attempted to find the nature of human development by studying the individual alone. Social practices developed by earlier generations had been outgrown so that they no longer met the needs of the times, and were, therefore, oppressive. The government had become tyrannical; the church, arbitrary; the school, formal. Rousseau, with his strong hatred of restriction and with his erratic judgment, came to the conclusion that "the whole sum of human wisdom consists in servile prejudices"; and that "our customs are nothing more than subjection, worry, and restraint."

[1] See pp. 304–305.

According to him, the individual human being is naturally good and in isolation from social influence would grow into the highest type of manhood; but, like a plant trampled in the highway, the individual is turned away from a natural development, and therefore corrupted, by social regulation. Society was represented, as has been said, to be the result of a deliberate agreement, a "social contract," entered upon by independent human beings, each having in mind his own advantage. Men, accordingly, were supposed to have developed their judgments of what things were worth while and their ideas of how to attain these before society existed; for these judgments of worth, these ideas of method, according to Rousseau, were the guides which led men to form a society. If men were developed before society existed, the latter was not a factor in that development.

Rousseau's position, if carried out logically, would make impossible the very individual growth which he sought. Only under social guidance can the individual get the purposes and ideas which constitute his development,—purposes and ideas which are the result of the coöperative work of the brightest minds of the race during thousands of generations. Without social regulation, human nature would be at the mercy of caprice.

Rousseau, consistent only in his inconsistency, ignored even logical regulation. In one place he says that the child should receive nothing from others, and should discover the truth for himself; but in another he advises that the child be placed under the direction of a tutor. To the extent to which the tutor guides him, the child obviously learns from another and is thus brought under the social regulation which has been imposed by society upon the tutor.

Rousseau's theory, mistaken because he neglected the social factor, may be tested by the effect which such ignoring of social regulation has had upon human development. Politically the criticism of Rousseau's mistake is written in the blood of the French Revolution, in so far as the Revolution was a blind destructive fury against social regulation. This destruction of social authority meant anarchy. Educationally the criticism of Rousseau's mistake is written in the erroneous practices of those who give undue emphasis to the spontaneous interests of the child by ignoring the fact that these interests can neither be understood nor profitably guided without the light of social purposes and ideas. Such persons are liable to mistake amusement for study and merely to indulge the child on his own level without promoting his development.

Rousseau's theory was in a large measure beneficial to human development, because generally in the institutional life of his time too little attention was given to the individual, and his one-sided theory tended to correct this condition. In education, for instance, he called attention to the importance of the interests of the child, which were neglected. Taken alone, Rousseau's theory is nevertheless illogical and injurious, because by neglecting the social factor he leaves man without regulation.

VII

The third factor, the educational, unites the individual and the social.

Human development may be examined under two conditions, either as completed or as progressing. In the analysis given above, attention was centered upon it as completed. In finding the nature of the social factor,

we considered man as a "social animal," a member of society, "a social outcome rather than a social unit;" in finding the nature of the individual factor, we imagined the human being known as Martin Luther to have experience acquired in different nations and at different times. Here only the social and individual factors are revealed. When, however, we study human development in the process of making, we find a third factor, which does not appear as a part of the completed product. This is the process through which social guidance is exercised, through which social purposes and ideas are selected and made available for the individual. It is the process that unites the individual human being and society.

Individual development under social guidance begins at infancy. Although the infant may be in the midst of the busy scene of social action, rich with its purposes and ideas, he is as helpless to make use of these purposes and ideas in promoting his development as he is helpless to make use of the food which society has in store for him, — and for the same reason. In either case, that which is best for him at the time must be selected and presented in a way adapted to his nature.

This selection and presentation of social patterns is done through the various forms of institutions, which may be classified as the home, industry and commerce, the state, the church, and the school. In the case of the school, the selection and presentation are done deliberately; but in the cases of the other institutions, they take place more or less incidentally in connection with the doing of other things. The main purpose of a shoe factory, for example, is to make shoes; but as the individual is promoted from easier to more difficult work, he

finds the best ways of making shoes selected for his acquisition and adapted to his ability to appropriate the purposes and ideas necessary to do the work. In like manner his growth is provided for in the home, the church, and the state. The more these institutions deliberately concern themselves with his development, the more effectual are they in promoting his acquisition of social purposes and ideas. In the selection of the curriculum and in the processes of teaching, the school deliberately undertakes to socialize the individual by giving him the best purposes and ideas which society has in store for him.

The greater the number and complexity of the purposes and ideas necessary for full participation in social life, the longer is the period of infancy, or dependence, during which they are acquired by the individual. In the comparatively simple life of primitive man, it lasted only to the earlier teens; in the complex civilization of the present, it is half again, if not twice, as long. Step by step in this advance, institutions have increased in educational importance.

That which brings the individual and the social factors together, uniting them in the development of a social person, by selecting purposes and ideas and by adapting them for acquisition by the individual, is the educational factor in human development.

VIII

Natural science explains human development as the acquiring of nerve connections which promote adjustment of the human organism to environment; and the three factors of this development as (1) the incomplete organism in which new connections between stimuli and responses can be made, (2) the racial inheritance of forms of response to stimuli, and (3) certain systems of group habits, such as education and government, which select racial forms of response and cause the developing organism to acquire them. These three factors are the physical counterparts of the individual, the social, and the educational factors, which we have considered from the teleological point of view.

Let us see how the conclusions which we have now reached from the teleological point of view are supported by the authoritative and accurate conclusions of natural science. The physical counterparts of the individual, the social, and the educational factors in human development are revealed by natural science in the explanation of this development as the acquiring of nerve connections which promote the adjustment of the human organism to the environment.

As the result of a long process of variation, natural selection, and heredity, the lower animal organisms are born with ready-made connections in the nervous system that equip them for an adjustment to environment. It is due to such inborn connections, which are the physical basis of instincts, that the spider spins its web, the bee stores its honey, and the bird builds its nest. But the advantage of being fully equipped at birth for the battle of life is dearly paid for, because this equipment can be improved only through the slow evolutionary process by which it was made. Its possibilities for variation, the first step towards improvement, are extremely limited; and any improvement can be made a permanent acquisi-

tion of the species only by being fixed through physical heredity in the nervous structure of succeeding generations.

Spiders, bees, and birds have made no change in abilities and in ways of acting since the days of primitive man; but during this time men have increased their abilities and improved their ways of doing things to an astonishing degree. They have bettered their vision with the telescope and microscope, their hearing with the telephone, and their locomotion with the automobile. In spinning, men have advanced from the hand loom to the marvelously effective machinery of great factories; in providing food, they have advanced from the precarious methods used by savages to the scientific methods of the farm, the factory, and the world of commerce; they have abandoned the tent of skins and the mud hut for elaborate, luxurious homes.

How does natural science explain this advance? There comes a time when evolutionary forces, instead of fixing all connections in the nervous system during the prenatal period, form only those which are absolutely necessary for life, such as those which control breathing, crying, swallowing, and digesting. The completion of other connections between stimuli and responses takes place in the intricate automatic "switchboard" of the brain after the child is born. These acquired connections are formed in accordance with racial models, selected by the group and adapted to the nature of the organism. Thus to the slow process of direct physical inheritance is added a process of racial inheritance, through which the organism may profit by successful forms of adjustment made at any time in the race, whether by the physical ancestors of the organism or not. Furthermore, an incomplete nervous system, such as that of man, makes possible greater

variation in reactions than does the complete nervous system, such as that of the bee or the spider. Greater variation makes for rapid progress by giving a greater variety of reactions and therefore a larger possibility for successful ones, which may be fixed through the influence of natural selection.

This materialistic explanation points clearly to three essential factors in human development: (1) an incomplete organism, (2) a racial inheritance of forms of reaction, and (3) certain systems of group habits which select racial models for adjustment and cause the developing organism to acquire them. Let us examine each of these three factors. *First,* the incomplete organism passes through a period of infancy, during which it acquires new nerve connections needed for adjustment. As Fiske says:

> It is babyhood that has made man what he is. The simple unaided operation of natural selection could never have resulted in the origination of the human race. Natural selection might have gone on forever improving the breed of the highest animal in many ways, but it could never *unaided* have started the process of civilization or have given to man those peculiar attributes in virtue of which it has been well said that the difference between him and the highest apes immeasurably transcends in value the difference between an ape and a blade of grass. In order to bring about that wonderful event, the Creation of Man, natural selection had to call in the aid of other agencies, and the chief of these agencies was the gradual lengthening of babyhood.[1]

Second, environmental influences guide the formation of the new nerve connections in the developing organism. With its inborn equipment for imitation, the immature organism acquires effective reactions under the guidance of more mature organisms, as when an apprentice reacts

[1] Fiske, John, *The Meaning of Infancy,* 1909, page 2.

more effectively in his work through imitating his master. It acquires useful reactions also as a result of the influence of tools, books, and all sorts of things that have been made by other organisms. The connections between stimuli and responses gained under such environmental influences, which are the result of many generations of progressive racial adjustment, may appropriately be called a racial inheritance. As Professor Baldwin says:

> The child, apart from the defective in mind or body, learns to speak, write, read, play, combine force with others, build structures, do bookkeeping, shoot firearms, address meetings, teach classes, conduct business, practice law and medicine — or whatever his line of further development may be away from the three 'r's' of usual attainment — just as well as if he had received an instinct for that activity at birth from his father and mother. His father or mother may have the accomplishment in question; and he may learn it from him or her. But then both the father and mother may not have it, and he then learns it from someone else. It is inheritance; for it shows the attainments of the fathers handed on to the children; but it is not physical heredity, since it is not transmitted physically at birth. . . . It is hereditary in that the child cannot escape it. It is as inexorably his as the color of his eyes and the shape of his nose.[1]

Third, various systems of group habits, such as those of school and state, select racial models for adjustment and adapt them to the immature organism in such manner that nerve connections guiding effective responses to stimuli are made in the organism. These systems of group habits have been developed through a long process of evolution. This factor becomes more prominent in promoting human development as the racial inheritance becomes more complex. Without it environmental forces impinging upon the organism would be so multifarious and

[1] Baldwin, James Mark, *Social and Ethical Interpretations,* 1906, pp. 69–70.

unrelated that no consistent growth of the nervous system could result from them.

We can now see how natural science clearly supports the conclusions we have reached from the teleological point of view. Since the same human development considered from the materialistic side consists of the forming of new nerve connections, and considered from the mental side consists of the acquiring of new purposes and ideas, (1) the organism capable of forming new nerve connections is the physical counterpart of the individual capable of acquiring new purposes and ideas; (2) the racial inheritance of models for adjustment which guide the forming of nerve connections corresponds to the social inheritance of patterns for purposes and ideas; and (3) the systems of group habits which select racial models and adapt them to the organism correspond to institutions, which select social purposes and ideas and adapt them to the individual mind. Natural science supports, therefore, the conclusion that the individual, the social, and the educational are the three larger factors of human development.

IX

A more definite study of each of the three factors marks the further main divisions of this book.

The three larger factors in human development have been differentiated in a general way. We have found, also, that the individual and the social factors are united by the educational. Each of these factors is itself a complex process. In order to understand more definitely the nature of human development, we must, therefore, make a special study of each factor by separating it into the elements of which it is composed and by discovering

how these elements combine to make We sha (1) the ind therefore, make a more intensive study of) the educa vidual process, (2) the social process, and urther mai tional process. These topics indicate the divisions of this book.

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PROBLEMS

1. What change must foreigners undergo in order to become true Americans?

2. Why do persons who have lived approximately all of their lives in the same American city differ in religious belief?

3. Explain the following: "Morally I am as much a part of society as physically I am a part of the world's fauna; and as my body gets its best explanation from the point of view of its place in a zoölogical scale, so morally I occupy a place in the social order; and an important factor in the understanding of me is the understanding of it." — Baldwin, J. M., *Mental Development*, 1898, p. 488.

4. What evidence can you give in support of the statement that as the education of a people increases coercive methods of social control decrease?

5. What concrete evidence can you give of the fact that in the case of human beings the period of infancy tends to become longer?

6. What is meant by educability?

7. Why under the same educational influences in the home and school do pupils of the same age attain various degrees of development?

8. How does the inheritance with which a human being is born differ from his social inheritance?

THE INDIVIDUAL PROCESS

CHAPTER III

ANALYSIS OF THE INDIVIDUAL PROCESS

The factors of the individual process are purposes and means of control. A purpose, in its fullest sense, is a possible condition of the self which the individual feels to be better than the present condition of the self, and to the realization of which his activity is directed. A means of control is a thing through the use of which a purpose may be attained; it has significance only because, in the light of reason, it is seen to be the means to some end.

I

The factors of the individual process are purposes and means of control, both of which appear when the individual is in action, and work together in forming new purposes and new means of control.

Having found that the individual process is one of the three larger factors in human development, let us now analyze this process in order to find how it makes, in accordance with patterns given by society, new purposes and new ideas, which control the conduct of the individual and constitute his personal development.

It is conducive to clearer thinking to substitute for the word *idea* the expression *means of control.* The word *idea* has been used historically with such varied meanings that its significance has become more or less indefinite. In the previous chapters, where sharp discrimination was unnecessary, this word could be used advantageously without exact definition; but, as our analysis becomes more

detailed, the meaning intended must be stated more precisely. The development of the individual requires that he see in the things about him, such as a drinking cup, a pencil, a law of physics, or a rule of grammar, the means of control through which his purposes can be attained. By ideas we mean the recognition of these things as means of control. It is better, therefore, to use in place of the indefinite term *idea* the more definite expression *means of control*, which represents the idea embodied in physical form, as in the form of a drinking cup, a pencil, a law of physics, or a rule of grammar. It may be added that a law of physics and a rule of grammar are just as truly physical things as a drinking cup and a pencil; one can see them when they are printed in a book or hear them when they are spoken.

When the individual process is examined in order to analyze it, two sets of factors appear, — one when the individual is apparently at rest, because no difficulty challenges his effort, and the other when he is in action, grappling with difficulties. This may be made plain by illustration. If I lean back leisurely in my chair and merely look at the pen with which I have been writing, I am apparently at rest; no problem disturbs me. Of this experience, there seem to be two essential factors, — *I* at one end of the experience and the *pen* at the other. Both appear to play essential parts in the experience, for it could not exist without both. These apparent factors are called *subject* and *object*. However, when I take up the pen and begin work, the scene changes. No longer do I simply contemplate the pen. The *purpose* of writing an analysis of the individual factor in human development looms before me; and, confronted by difficulties, I strive through various *means of control* to carry it out.

The pen, which a moment ago was a mere object of consciousness, now begins to play a new rôle; it has become one of the instruments or means used in carrying out my purpose. Whenever the individual is thus in action, the essential factors of his experience are (1) purposes and (2) the means of control used for attaining them.

In the analysis of the individual process, we are concerned primarily with the individual in action, because only when he is in action are new purposes and new means of control acquired. This may be seen more clearly through illustration. The new-born child, looking out into the world, is not conscious of the purposes felt by the adult; nor does he see in the things used in the realization of these purposes the meanings which they have for his elders. Moreover, if he does no more than passively to look and to listen, the world about him will continue to appear the same; he will remain unconscious of worthy purposes and meaningful things. Not until desires have awakened within him and he has striven to attain their objects can he become directly conscious of what the adult feels and understands as he looks upon the world. That the child must learn by doing is a commonplace. In the Book of Genesis it is recorded that God, in carrying out His divine purpose, created heaven and earth and the things that in them dwell, and then "saw everything that He had made." So with man; he must actually create the things in his experience through the process of working in the realizing of his purposes, before he can passively contemplate these things as mere objects.

It is a fallacy of popular thought to believe that knowledge of the world is made by the interaction of subject and object, the factors of the individual process when the individual is apparently at rest. This is a very natural

mistake, because when a person stops to examine his experience, he finds it in a static condition for the very reason that he has stopped. He passively looks at the pen or tablet, or merely gazes at the distant church steeple, and asks himself the question, How do I know this thing? There is activity, of course, in the attempt to answer the question, but this activity is engaged in making an analysis of the experience of himself looking at the object; this activity is not the experience that is being analyzed. The subject and object, which appear under these circumstances, seem to claim responsibility for the making of the experience analyzed.

Not a few great philosophers, indeed, have been misled in their theories of how knowledge is acquired by making this same mistake of confining their analysis to the mind in the passive condition of contemplation, in which the real factors of knowledge do not appear. Locke, for instance, took this view and thought that the subjective mind is like a blank tablet upon which the objective things of the world make their impressions through the medium of the senses. Another example is that of Kant, who with his keen logic analyzed the passive experience of the individual at rest, showing that the subject contributed such forms as time, space, and relation, which are always present, no matter what the content of experience may be, and that the objective things of the world contributed the "matter of sense," which is responsible for the differences in the various objects that are known. He assumed that, in the making of experience, the object began the interaction with the subject.

In both cases, these philosophers examined experience, not in the process of making, but after it had been made, and when, therefore, it could be an object of contempla-

tion; and since the only factors apparent to them in experience as a completed product were the subject and object, it was very natural for them to assume that in some way these were responsible for the origin of the knowledge of things. Having made this erroneous assumption, they undertook to solve the false problem of how the subject and object interact to create knowledge, — a thing that these phases of experience never interact to do. It is obvious that there can be no point of contact for interaction between the physical world and a spirit, which is immaterial. No more effectual criticism of such theories can be found than the irony of their conclusions, which attempt to explain how the subject and object interact to make new knowledge; and which, at the same time, having the defect of metaphysical dualism, represent the subject and object, mind and matter, to be realities absolutely incapable of interacting.

Fortunately, however, it is not necessary to trace the shortcomings of popular thought or to point out the inconsistencies of the intricate metaphysical discussions of this matter by philosophers. Conclusions have no more truth than the assumptions upon which they are based. All the fine-spun logic that any philosopher may devise to show how knowledge is made through the interaction of subject and object may be cast aside as ineffectual if only we know that knowledge is not made through such interaction. And we do know that neither new knowledge nor new purposes are made through the interaction of subject and object, because a product is one thing and the process through which it is made is another; and, therefore, when the product is separated into its component parts, the result is simply the parts of the product, not the parts of the process through which it was made.

For example, separating an automobile into the parts of which it is composed does not give the instruments with which the automobile was made. In the factory the heat of the forges, the power of the engines, and the shaping force of the machines have done their work and do not appear as parts of the completed automobile. Likewise, separating an experience of a pen, or of anything else, into its subjective and objective phases does not give the parts of the process through which it was made. Purpose with its heat of desire and power of will, and the shaping force of ideas in the form of means of control, which were necessary to make this experience, have done their work and do not appear as parts of the intellectual product. When, on the other hand, we examine the individual process in action, we find that as truly as the fire of one forge can kindle another fire and one machine can form another machine, so existing purposes and means of control can be factors in the making of new ones. How this is done will appear later, and then our understanding of the matter will be more clear.

II

A purpose, in its fullest sense, is an apparently possible condition of the self which the individual feels to be better than the present condition of the self, and to the realization of which his activity is directed. Its realization may be near or remote, and its value is known only through feeling, the judgments of which are absolute. A means of control is a thing through the use of which a purpose may be attained. It is known through reason, which sees causal connections among things, but which is blind to all value.

Before placing in the court of natural science for its authoritative judgment the conclusion that new purposes and means of control are made by other purposes and means of control already in experience, we should state

more definitely the nature of these two factors in the individual process.

Purpose, in its various aspects, is termed *thing desired, value to be controlled, value appreciated, thing worth while, end in view, good, ideal, intention, motive.* In every instance, it is marked by a feeling of value and by activity intended to bring this value into realization, both of which attributes are indispensable. In its fullest sense, a purpose is an apparently possible condition of the self which the individual feels to be better than the present condition of the self, and to the realization of which his activity is directed. This does not mean that it must be selfish. A mother may have for her purpose *herself ministering to a sick child,* a condition that she values as more worthful than her present condition, despite the fact that it may include wearisome work and loss of sleep. A missionary may have in view *himself teaching religious beliefs to a foreign people,* although this condition means the sacrifice of many of the comforts of life. A soldier may feel a better condition of himself to be that of fighting at the front in defense of human rights, even though this may include painful hardships and even death. Thus we may see that the total situation is included in the condition of the self. However, although a purpose in its fullest sense is felt to be a better condition of the self, some feature is usually singled out to stand for the whole condition, as when a man is said to desire a glass of water, a chair, or a political office, although the complete object of his desire is himself drinking the water, resting in the chair, or enjoying the emoluments of the office. So in the other illustrations cited, the purposes may be said to be the comfort of the child, the conversion of the heathen, and the vindication of human rights.

Purposes vary greatly in the amount of time and activity necessary for their realization. Sometimes they are projected far into the future and require years for their attainment, as when a youth on entering college has the purpose of becoming a teacher, an engineer, or a physician; or when, under the inspiration of religious hope, a man places his purpose beyond the grave and works to make himself worthy of happiness in the world hereafter. At other times the purpose may be of a kind quickly realized, such as that of getting a drink of water or one's slippers and an easy chair, or even of continuing an act which is enjoyable in itself, such as riding on a merry-go-round or listening to an orchestra.

The expression *means of control* is self-explanatory. It refers to whatever is used to attain an object of desire, or, in other words, to realize a purpose. If the purpose is to get an apple growing high in a tree, the means of control may be a ladder; if the purpose is to speak correctly, the means of control may be the rules of grammar; if the purpose is to be a physician, the means of control may be a college course, followed by several years' work in a medical school, and a year's experience in a hospital.

The difference between a purpose and a means of control is not inherent in the things themselves, but depends upon the attitude of the person concerned towards these things. The same thing may be regarded by an individual at one time as a purpose and at another as a means; or, at the same time, it may appear to one individual as a purpose and to another as a means. A child may climb a ladder at one time merely because he has an immediate desire to climb it, and at another time for the sake of using it as a means for getting apples from a tree. A student who enjoys mathematics may at one

time have as the direct object of his desire the solution of a problem in arithmetic and at another time he may use the problem in arithmetic as a means in the purchase of apples or oranges, which are the things desired. Or, again, a miser seeks gold for the love of it, while his neighbor may regard gold as the means of buying bread. In a word, when the individual seeks a thing which he feels valuable in itself and beyond which he does not look, his personal attitude makes it appear to him as a purpose; when he sees that a thing bears significance and value because of something else to which it leads, his personal attitude makes it appear as a means of control.

The essential characteristic of the personal attitude which makes a thing appear as a means of control is *reason*. Reason sees the causal connections among things, but is blind — absolutely blind — to all worth whatsoever. The only way, therefore, in which it can be of assistance in determining the value of a thing is to reveal the fact that this thing leads to something else otherwise recognized as worth while. If a person is asked to show by reason why anything in the world is valuable, he must always reply by showing its connection as a means of control with something else the value of which is not apparent through reason but through feeling. A railroad time table is valuable to a vacation excursionist, not in itself, but because it is seen through reason to be a means for arranging an enjoyable trip. Richard III exclaimed "A horse! A horse! My kingdom for a horse!" because reason revealed to him that a horse was a necessary means to the realization of his purpose in battle, the worth of which purpose he strongly felt.

The fact that reason, although it can see the causal connections of things as means to ends, is blind to all

value, is evident when two persons who differ in their evaluation of the same thing appeal to reason to support their judgments of worth. To one man a tariff on wool appears to be a good thing because it leads to larger receipts for the product of his farm; to another it appears to be a bad thing because it leads to a larger expenditure for his clothing. Two persons can through the use of reason agree as to the worth of anything, whether important or unimportant, only when reason enables them to connect the things as means exclusively with some value or values which they both feel to be the same. A person explaining why he values a thing usually does not give a full explanation, because he does not recognize the connection of a thing with all the values that influence his appreciation of it.

The essential characteristic of the personal attitude that indicates a purpose, is *feeling*. Feeling pronounces a thing to be worth while without reference to its connection with anything else, and its judgments are categorical, or absolute. If a person is asked why he values a certain purpose, and the purpose still remains as such, not being transformed by reason into a means of control in the service of something else, he can reply only "Because I do!" On the other hand, should he transform the purpose into a means of control by explaining its value as borrowed from something else, he must, if the questioning is pushed far enough, come eventually to the point where there is nothing with which to connect the thing as a means of control; that is, to a judgment of feeling. Were it not for this fact, no value whatever could be known. Aristotle explained why this must be true, when he said: "We . . . do not choose everything for the sake of something else, for thus we should go on to infin-

ity, so that desire should be empty and vain." [1] Supposing, now, we were to meet a student on his way to the library to study a problem in the history of education. We might question him regarding his purpose somewhat as follows:

"Why do you go to the library?"

"To solve a problem in the history of education."

"But why do you desire to solve this problem?"

Since the only way in which the object of his desire may be justified rationally is to show it to be the means to something else felt to be worth while, he replies, "Because it is valuable in getting an understanding of the history of education."

"But why do you wish to understand the history of education?"

"Because it gives an appreciative insight into the present educational situation."

"And why do you wish to get this insight?"

"Because I desire to become a teacher."

"Why do you desire to become a teacher?"

"Because I desire to help in the development of human life and at the same time to earn a livelihood."

"Why do you believe that it is valuable to help in the development of human life?"

"Because I do! I *feel* that it is!"

Taking the other purpose assigned, we ask, "And why do you wish to earn a livelihood?"

"In order to enjoy life."

"Why do you desire to enjoy life?"

Again comes the categorical answer, "I *feel* that I do!"

Any line of reasoning will lead to a similar result, if continued far enough. Whether a purpose remains as

[1] *Nicomachean Ethics*, Bk. I, Ch. II.

such or is pursued by reason to the limits of experience, its value is always known through feeling.

III

Natural science shows that (1) checks in the functioning of instincts or habits and (2) old responses which become incorporated with the checked instincts or habits so as to overcome the checks, are the factors of the process through which the organism adjusts itself to the environment. These are the physical parallels respectively of purposes and of means of control as the conscious factors of the individual process in its development.

Is the analysis that has been made of the individual process from the point of view of teleology supported by the conclusions of natural science? From the point of view of teleology, individual development takes place when a person, through the process of projecting purposes and working to realize them, acquires new purposes and new means of control, which together improve the guidance for his activity. From the point of view of natural science, individual development takes place when the psychophysical organism acquires, in response to stimuli, new reactions which more adequately adjust it to the environment. Let us now see whether the mental factors which teleologically appear to make new purposes and new means of control are the counterparts of the physical factors which, according to natural science, make new reactions to stimuli.

Natural science teaches that the first factor in making a new reaction is a check or obstruction in the functioning of an instinct or of a habit of response to stimuli. Just as an obstruction in a river channel diverts the water through another course, so a check in the pathway of a habit of response diverts the energy released by the stimuli into a pathway leading to a new reaction to the situation.

To illustrate, let us imagine an organism in which the visual stimulus of candy habitually passes over into the response of putting the candy into the mouth and eating it. If now the organism is subjected to the stimulus of candy in a wrapping of transparent waxed paper, this stimulus begins to pass over into the habitual pathway of reaction; but the eating is checked because the paper sets up in the mouth a stimulus which habitually passes over into the conflicting response of expectorating. The second factor now appears. Energy, blocked in the old pathway of the response of eating, is now diverted into a new one, and a corresponding new reaction is made. This may be tearing the paper. When the paper has been torn away, the stimulus of the candy can pass along the channel of the habit of eating, since the obstruction has been removed. Thus a new reaction has been developed in the situation involving the stimulus of candy in transparent waxed paper; namely, the reaction of removing the paper before putting the candy into the mouth. The organism is thereby better adjusted to its environment. To carry the illustration further, when the organism is subjected to the stimulus of candy in a shop window, the passing of the stimulus over into the habitual response may be checked by conflicting reactions started by the auditory stimulus of the sounds "Hands off!" and the visual stimulus of the approaching shopkeeper. As a result, the response may be checked until a new reaction, such as giving money to the shopkeeper, is formed. Again, if there is an habitual reaction of getting the money by asking the parents, and if through any cause this reaction becomes ineffectual, there may be formed, in circumventing the check, some new response, such as wiping dishes or running errands.

A check in the functioning of an instinct or habit of reaction to a stimulus, which is the first physical factor in the process of adjustment, is the physical parallel of a purpose. If one's breathing is checked, he at once feels a desire to breathe, at once has in mind the purpose of breathing. When, as in the illustrations given above, the habit of eating candy is delayed in any way, the purpose of eating candy appears in the mind of the individual. Natural science, therefore, supports the teleological account of the first factor in the making of new experience.

The pathway of reaction incorporated with the obstructed response in such a manner that the obstruction is overcome, the second physical factor in the process of adjustment, is the physical counterpart of means of control, which appears in consciousness. When eating candy is checked as described above by the presence of a paper wrapping, the organism responds by tearing the paper. The response of tearing, which obtains under other situations, is here modified in such manner as to become a part of the reaction to the stimulus of candy in a transparent waxed paper. In a similar way, habits of giving pennies to the shopkeeper, of wiping dishes, and of running errands become a part of the response to the stimulus of candy in a shop window. Since a check in the expression of an habitual response is the physical counterpart of a purpose, the new reaction which overcomes the check is the counterpart of a means of control in the service of this purpose. Natural science supports, therefore, the teleological account of the second factor in the making of a new experience.

In the case of an organism acquiring new reactions through imitation, the factors are the same as those explained above, in so far as the brain activity is paralleled

by consciousness. A check in the response of imitating is paralleled by a purpose to do what another person is doing. Then some pathway of reaction is incorporated with the checked response in such manner that the check is overcome and the imitating is realized. This pathway of reaction is paralleled by a means of control, which appears in consciousness.

From the physical point of view, it is plain that the individual does not acquire new purposes and new means of control when he is apparently at rest, a condition in which the factors of his experience appear to be subject and object. When the organism is thus responding to a stimulus by merely looking at some object or by merely sensing it in some other way, no new response is made; the energy passes over a pathway of response already formed in the brain. It is only when the pathways of response are changed that new purposes and new means of control appear in consciousness.

That "a little learning is a dangerous thing" is sometimes exemplified by a loose kind of thinking which makes psychology seem to support the mistaken theory that new experience is caused by the interaction of subject and object, as in the case of a person merely looking at a pen. Here we have the *I* on the one hand and the *pen* on the other. In this loose thinking, the subject is confused with the psychophysical organism and the object with the environment. It is true that the organism and the environment do interact, but they are not to be identified with the subject and the object. Both natural science and teleology, as we are about to see, pronounce against this mistaken identity.

Natural science tells us that the organism is affected by stimuli from the environment and reacts to these stimuli,

and that the passing of stimuli over into response makes a brain activity which is paralleled in consciousness by a single experience of which the subject is one aspect and the object is the other. Neither subject nor object depends upon the organism more than the other; neither depends upon the environment more than the other; as the two aspects of one experience, they are together the mental counterpart of a change in the physical organism produced by the interaction of the organism and the environment.

Teleology explains that the organism, instead of being identified with the subject, is as much an object in experience as is the environment; and that both the organism and the environment are equally physical objects used by natural science in explaining mental phenomena. The subject is so far from being identified with the organism that it is distinguished in consciousness through its contrast with the organism, just as much as it is distinguished through its contrast with what natural science terms the environment.

IV

Problems for further study are (1) how new purposes are made; (2) how new means of control are made; and (3) how these together constitute personal development.

The individual process has now been analyzed into its factors, which have been found to be purposes and means of control. Since the development of the individual consists in acquiring new purposes and new means of control, three problems at once appear: (1) How do the factors of the individual process make new purposes? (2) How do they make new means of control? and (3) How do purposes and means of control, which are both the

factors and the products of the individual process, together constitute personal development? The answers to these three problems complete the taking apart and the putting together of the individual process, or, in other words, its analysis and synthesis.

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PROBLEMS

1. *a.* Name five purposes you have attained to-day. *b.* Name five means of control you have used in attaining these purposes. *c.* What is the essential difference between these purposes and means of control?

2. Name some purpose which you expect to attain several years from now and some of the more important means of control you expect to use for the realization of this purpose.

3. Name three acts that at various times you have performed both as ends in themselves and as means of control.

4. Explain what corresponds to purposes and what corresponds to means of control in the following: "Consequently the educational values of different subjects . . . consist (*a*) in the scope, kind, strength, and permanence of the incentives to activity; and (*b*) in the kind, degree, and permanence of the power to think and to execute that those subjects may develop." — Hanus, P., *Educational Aims and Educational Values*, p. 7.

5. *a.* What is the essential function of feeling? *b.* Give an illustration of the function of feeling taken from your own experience.

6. *a.* What is the essential function of thought? *b.* Give an illustration of the function of thought taken from your own experience.

7. Is a mere knowledge of what is right a guarantee that the right will be done? Explain.

8. What evidence does the theory of evolution give in support of the fact that knowledge and appreciation are for the sake of action?

9. What justification is there for saying that an idea is an incipient action?

10. According to the natural science explanation of the basis of consciousness, would a human being perfectly adjusted to his environment be conscious? Explain.

CHAPTER IV

HOW NEW PURPOSES ARE MADE

Acquired purposes are originally means of control to which feelings of value have been transferred from the ends these means served. The steps in the process through which a means of control is made into a purpose are (1) a feeling of the value of some purpose, (2) the association with this purpose of some means for its realization, and (3) the use of the means in realizing the purpose.

I

The fact that the value of a purpose is explained by transforming the purpose into a means to some end, suggests the way in which the purpose was made.

That new purposes appear in the life of the individual is a matter of common experience. As a child of ten, a youth of twenty, and a man of forty, he has a change of purposes corresponding to the change in his activities, for purposes are the ends towards which these activities are directed. "And one man in his time plays many parts." But however pronounced the change in purposes may be, the process through which it takes place is not directly evident; for, as Athena sprang full-armed from the head of Zeus, so purposes seem to spring immediately into consciousness, fully equipped for the leadership of activity. To find how purposes and means of control already in the experience of the individual work together to make new purposes, is the problem of this chapter.

The way in which the values of acquired purposes are explained suggests the way in which these purposes are made. It has been shown[1] that the only method by which the value of a purpose can be explained is that of transforming the purpose into a means of control for attaining something else felt to be worth while. That which was at first felt as an end desired then appears, in the light of reason, to be worthful not in itself, but because it serves a worthy master. The fact that the value of a purpose can be explained only by transforming it into a means of control suggests that the purpose was originally a means of control, recognized as valuable because it led to something else worth while, and that in time the derived nature of its value has been lost sight of, so that the act is felt to be worth while in itself.

II

The transforming of means of control into purposes through (1) a feeling of the value of some purpose, (2) the association with this purpose of some means of control for its realisation, and (3) the use of this means in realising the purpose, is a common and necessary happening in everyday life.

The change of means of control into purposes, or ends, is a common happening in everyday life. A man in the city locks his house at night for the purpose of protecting the valuable contents. Locking the house has therefore a value only as the means to something else. But, when the act has been repeated regularly, he may feel at night a desire to lock the house, although he does not, at the moment, call to mind the original purpose for doing so. Locking the house has now become an end in itself; that is, a purpose. Categorically it commands his activity.

[1] P. 59.

Even if he moves to the country where there is no danger from thieves, he will nevertheless feel at night a desire to lock the house, and may do so, unless he tests the value of this purpose by reasoning about it and finds that the act, when viewed as means, is connected with an end no longer worth while. At first the housewife washes dishes, not for the sake of the process, but because in the light of reason dish-washing is seen to be the means to other things desired. In time, however, she does not first have in mind these other things, but rather feels directly that dish-washing itself is a thing worth doing. When a man is accustomed to go to his office each morning for the purpose of transacting business, going to the office may appear to him as an end in itself. A person who would otherwise be indifferent to the study of the principles of education and who undertakes such study only as one of the means in the realization of his purpose to become a teacher, may later, when the hour for study arrives, feel directly that he should resume work in the principles of education, without thinking of the end which originally made him conscious of its value.

In the same way, a person acquires such general purposes as being industrious, neat, honest, just, and temperate. He is indifferent to these virtues until they are found to be the means of securing such desirable ends as rewards, freedom from punishment, social approval, and values promised by religion, and of securing many other ends with which in everyday life they are connected in a natural and intrinsic way. The child may feel in these general purposes only worths which have been transferred to them because he has found them to be means to freedom from punishment and means to approval by those dear to him; the adult may feel in these purposes rich

composite values because he has found them in the service of many worthy consequences with which they are intrinsically connected.

Acquired purposes may become endowed with great independent authority. Individuals will lay down their lives for country and home, the cherishing of both of which is acquired. They will make the greatest sacrifices in the service of truth, honor, and justice. Indeed, even when the value is a false one, its authority may not easily be surrendered. Older people, under the influence of feeling, often persist in holding to "the good old ways" when newer ways are better. How many persons feel the value of such things as seeing a new moon over the right shoulder or avoiding Friday as a time for beginning important enterprises, even after these felt values are known to have sprung from childish superstitions no longer believed! The fact that Friday is an unpopular day for weddings and for the sailings of vessels is practical evidence of the persistence of one of these purposes.

The illustrations that have been given reveal three essential steps in the making of a new purpose: (1) the value of some purpose previously acquired must be felt, (2) some means for realizing this purpose must be associated with it, and (3) this means must be used in realizing the purpose.

The more strongly the value of the original purpose is felt, the more quickly and effectually is it carried over to the means. A young woman who has been given a ring as a means of symbolizing her betrothal, may feel at once a stronger immediate purpose to preserve the ring than the normal value of the ring would command. A child that has been burnt dreads the fire as soon as he recognizes it as the means of his suffering. A man who has

accidentally shot a friend may by this one experience acquire a desire to avoid firearms, the very sight of them arousing in him a feeling of revulsion. Out of one incident may be born a purpose to foster the friendship of a person whose help has been a means of escape from dire distress. A person who has found religious belief a means of consolation in the presence of death may feel from that moment a desire to cherish this belief.

The greater the variety of valuable purposes which a means is seen to serve, the richer and more composite is the worth transferred to it. For this reason a virtue such as honesty, industry, or justice appears as primarily an end to be desired even when the individual is conscious of some purpose in relation to which it is a means of control. The value transferred to it from many other purposes completely overbalances in importance the value of the particular end with relation to which the individual at the moment regards the virtue as a means. A thing such as a pen or a knife, which has been associated mainly with only one purpose, appears as primarily a means of control if consciously connected with this purpose. The value transferred to it from other purposes does not overbalance in importance the value of the purpose with relation to which the individual regards the thing as instrumental. If, however, an individual has in mind a pen or a knife without thinking of its normal use, he may regard it as primarily valuable in itself rather than as instrumental in nature. An individual, for instance, who reaches for his fountain pen and finds that it is lost, may feel its value without being conscious of the important purpose in the service of which it has been found useful. Since everything is connected with more than one purpose, even when the thing is regarded as a means of control, there

is an accompanying feeling of its value that depends upon purposes with which it has been connected, but which are not now in consciousness. The pen with which one intends to write may, for example, seem to have a value immediately appreciated and not dependent upon his purpose of writing.

A purpose, as has been stated,[1] is dynamic; it involves not only a feeling of value, but also activity to bring this value into realization. While every feeling of value marks an incipient action, this action may be very weak, so that the result goes no farther than a faint desire or wish. If the original purpose is so feeble that action for its realization does not persist, whatever feeling of value may be transferred to the means is obviously impotent to command action, and the means cannot, therefore, receive from the abortive purpose the strength necessary to make it an end in itself. Thus it is that individuals acquire many feelings of value that are easily recognized, but are too feeble to command conduct. Such feelings of value may be of service, however, if the individual, under religious or some other ethical influence, acquires a purpose to do the best he can, as in the case of a person who in religious conversion acquires the desire to do what God would have him do. The weak appreciations made of the values of many acts then point out what is best and are transformed into purposes through serving this new ideal. Religious sanction is often very powerful in vitalizing in this manner weak appreciations so that they become strong purposes, as the change in conduct that often results from religious conversion gives evidence.

If the primary purpose is strong, and therefore marked by persistent activity, the means used in its service may

[1] P. 57.

become an end in itself, even before the primary purpose has been realized. Instances of new purposes developed under these circumstances may be found when individuals regard great social practices, such as equal suffrage, prohibition, and international arbitration, as ends in themselves, although they have only begun work to secure the adoption of these social practices. Even in cases where the means sought is a mistaken one and the welfare expected cannot be secured through it, if the primary purpose is marked by persistent activity, the means may be crowned with a halo of derived value as an end in itself. History recounts many mistaken causes and many lost causes that through values acquired from ends unrealized have taken direct command of the labor and sacrifice of men. An illustration of a cause that was felt in this way to be valuable, although both mistaken and lost, is the persecution of early scientists as a means of protecting religious faith.

There are some acts, — drinking, lying, and stealing, for example, — that seem to have negative values; one feels that they should be avoided rather than performed. The general principle, however, applies here as well. To avoid a thing in order to attain some purpose is a way of acting with reference to it, a way of using it in the service of a purpose. In order to secure business and social success, and to avoid ill health, poverty, and domestic unhappiness, one must not drink intoxicants; in order to keep one's friends, to secure success in business, to be respected, and to attain many other values, one must avoid lying and stealing. When value has been transferred from the end originally served, avoiding a thing may become an end in itself.

The change of means into ends is necessary in everyday

life, if the individual is to carry out his life's work effectually; for otherwise, in deciding what should be done from moment to moment, his mind would be so occupied with following the complex network of threads connecting means with remote purposes that there would be no time for anything else. Imagine a man about to be run down by an automobile not appreciating the fact that he should get out of the way until he thought of certain remote values and discovered by a process of reasoning the worth of getting out of the way as a means of attaining them! What if the house-wife or the business man had to begin with remote values and reason out the worth of every other act as means to these ends before knowing what should be done from moment to moment! If means did not become purposes, how much time would be lost every day in tracing the reasons for being industrious and honest!

III

The methods commonly used to create new purposes give practical evidence that purposes are originally means of control to which feelings of value have been transferred from the ends these means of control served.

Since purposes command the conduct of the individual, the way to influence his behavior is to control the making of his purposes. Methods commonly used to do this give practical evidence in support of our conclusion as to how purposes are acquired. In order to make a child feel the worth of industry, he is placed in situations where industry is a means of avoiding pain and of securing reward, even if the parent or teacher acts arbitrarily in creating these situations. In a similar way, when the child becomes a man, society may regulate his feelings of value

more or less arbitrarily by making certain acts the means of securing approval or of avoiding disapproval on the part of those with whom he is associated, and even by making certain acts the means of avoiding fines and imprisonment administered by authorized representatives of the state. To lead a person to feel the true value of being temperate, he is shown in the light of reason the many worthful ends that are served by temperance and is impressed with the evils of intemperance. In this way he is made to recognize temperance as a means of avoiding certain evils and of securing certain good results. For the sake of creating party loyalty, which consists of a purpose to further the interests of the party as an end in itself, the political speaker recounts the many advantages his party has been the means of securing for the local community, the state, and the nation. References to great statesmen may be added to this, the national flag may decorate the rostrum, and patriotic music may be played, so that the individual gets the impression that support of this particular party is a means of promoting the welfare of society, of carrying on the work of statesmen who are appreciated as important factors in shaping the destinies of his country, and of being patriotic.

One common way of developing purposes is through advertising which creates in the individual a predilection for that which is advertised. To create a purpose to use a certain kind of breakfast food, the pleasures of a meal are pictured. A dining car commanding a view of invigorating mountain scenery is represented. An immaculate waiter has placed on the snowy white table, along with fresh carnations and roses, a portion of the breakfast food, garnished with berries or other fruit. In connection with the picture, there may be also adjectives

such as *appetizing, invigorating,* and *delicious.* The observer is made to feel strongly the pleasurable value of eating and to associate with this value, as a means to the enjoyment of it, the breakfast food advertised. Advertisements of guns and ammunition picture stimulating hunting scenes, suggesting that the particular kinds of guns and ammunition represented are means to enjoyments such as these. An advertiser of clothing represents the wearer of garments of his make as enjoying social pleasures and commanding the attention of men of affairs. To put a halo of acquired value about certain brands of silver-plated tableware, value is borrowed from the honeymoon by depicting the bride in her attractive new home ecstatically examining the articles advertised. Makes of automobiles are pictured amid charming surroundings to the enjoyment of which the machines appear to be the means.

Even where the true value of the thing advertised is doubtful, a purpose to use it may be created. A large signboard pictures a throng of workmen engaged in constructing the Panama Canal. The observer is impressed by the wonders accomplished. Then he sees the representation of a plug of a certain brand of tobacco together with the words, "The men who chew are the men who do." This sentence is so worded that it will not only stick in the mind but cling with surprising tenacity to the picture with its halo of value, — all for the purpose of transferring some of the appreciation one has for the construction of the canal to the chewing of the tobacco advertised. Again, advertisers draw upon the popular admiration for baseball heroes to create feelings of worth about their several brands of cigarettes, and suggest other values by such adjectives as *pleasurable, enjoyable,*

satisfactory, and *invigorating,* and by slang expressions that appeal even more vividly to the imagination.

In these instances of the methods commonly used in making purposes only two steps have been presented, — the calling forth of an appreciation of value, and the associating with this value of means for realizing it. Whether the individual takes the third step, that of activity in realizing the value appreciated, depends not only upon the influence of this value but also upon the freedom of the pathway of activity from obstacles, especially at its beginning. In the early crusades against intemperance, a drunkard, after he had been led to appreciate the value of temperance, was asked to begin action by merely signing a pledge card. After a reader has been led by an advertisement to desire some commodity, he may be asked merely to fill out and mail a blank or to call at a neighboring store. When a child has been impressed by the value of industry, he is more likely to try to realize this ideal if temptations that would interfere with industrious action have been removed.

IV

All purposes are not derived, but to isolate those which are original, or primary, is difficult.

If purposes already in the experience of the individual are factors in the making of new ones, the individual must be endowed with an original stock of these to begin the process. For this reason, in explaining the values of purposes by reducing them to means of control in the service of other things that are valuable, one must sooner or later reach a purpose the worth of which is known only by feeling and for the value of which no reason can be assigned. These ultimate, or primary, values are the originals.

It is difficult to isolate them, because the farther the web connecting means with ends is unraveled in explaining the values of purposes, the more complex it is found to be. Usually the value of an acquired purpose is very composite because it has been derived from a number of worthful ends in the service of which what is now a new purpose formerly appeared as a means of control. In turn, each of these more remote purposes has likewise a composite value. Indeed, even original, or primary, purposes are caught again and again in the web connecting means with ends, so that they themselves acquire a composite worth through instrumental connections with other ends, either ultimate or derived. To live is an ultimate purpose, since it is desired often when no reason for this desire can be given; yet, at other times, a man may desire to live for the sake of providing for his family, of bringing about some social betterment, or of accomplishing something else upon which his heart is set. In romantic love wherein the lover is guided only by feeling, the desire for a mate is felt as ultimate; but he may desire a mate also as a means for providing a home and family, so that in old age he may have cherished companionship.

V

The fact that virtuous acts have an apparently external authority independent of the ends which they are known to serve, and the fact that in any particular situation the end does not justify the means, do not conflict with the conclusion that acquired purposes are originally means of control to which feelings of value have been transferred from the ends these means served.

Two facts seem to conflict with the conclusion to which common experience has led us. One is that virtuous acts, the worth of which has been represented as acquired,

have an apparently external authority independent of the values of the ends which they may be known to serve; the other is the generally accepted belief that the end does not justify the means. However, if the conclusion that acquired purposes are originally means of control is properly understood, neither of these facts militates against it.

Thousands of individuals, it is true, bow before the authority of such virtues as truthfulness, honesty, justice, temperance, without ever having been conscious of the connection between these virtues and the ultimate values to which they intrinsically lead, and which, according to our conclusion, are the real source of their authority. But the web of connection has been woven, nevertheless. For countless generations society has been weaving it for individuals and recording the results in history, literature, art, customs, and institutions. Society approves these virtues because it has discovered their intrinsic connections with valuable results, and the individual accepts them upon social authority. But even in accepting ideals upon social authority, the individual does so only because he sees them as means to a worthy end. When he has understood and used them as means for securing social approval and for avoiding social disapproval, these purposes transfer to them rich composite values. Even in the case of religious sanction, a feeling of the worth of a virtuous act is acquired by the individual in a similar way as means to the highly valuable purpose of securing divine approval. The feeling of the unworthiness of vice may be explained likewise, since, as we have learned, avoiding a thing is a way of using it in the service of a purpose.

With regard to the well-fixed belief that the end does

not justify the means, it must be acknowledged this belief is true if by *end* only one particular end is meant. Stealing cannot be justified as worthful because in a particular instance it is connected with desirable consequences. A poverty-stricken individual may satisfy his immediate needs by theft while the wealthy corporation from which the property is taken may never feel the loss, and yet the act of theft should be avoided as a thing of negative worth. This is true because the evil of the act of stealing depends not upon one consequence but upon many. The felt values of these many consequences become transferred to the means and are fused into the feeling that marks the negative value of this vice. Therefore, although stealing may be the means to a particular end which, taken in an isolated way, appears as good, still it has a great residue of negative value derived from other consequences that are evil; and this residue of negative value marks the act as a vice, a thing to be avoided, irrespective of any particular end to which it may lead. In reality, one particular act of theft cannot be isolated; it has many consequences, among which is the tendency to make the individual a thief under other circumstances when the immediate results may be decidedly harmful. The belief that any particular end does not justify the means does not militate, therefore, against the truth that ideals get their values, often very composite ones, from the ends which they originally serve.

VI

Ethical theory, which includes a critical study of the nature of values, supports the conclusion that acquired purposes are originally means of control to which feelings of worth have been transferred from the ends these means served. Even the two extreme schools of moralists, taken together, support this conclusion. The utilitarian emphasizes the fact that means derive value from the ends they serve, while the intuitionalist emphasizes the fact that value is known directly only through feeling. By the uniting of these fractional truths, the whole truth is revealed.

Ethical theory, which includes a critical study of the nature of values, supports the conclusions to which common experience has led us in seeking an answer to the problem of how new purposes are made. With regard to the way in which the individual comes to an appreciation of moral distinctions, ethical theory furnishes, in addition to intermediate schools, two extreme groups of witnesses, who, instead of agreeing upon a definite conclusion, are often opposed to each other in their testimony. One group is called the utilitarian, empirical, or teleological school, and the other is called the intuitional, formalistic, or moral sense school. The utilitarian lays stress upon the fact that the worth of many purposes is derived from some ultimate value or values which these purposes serve; he would say that justice is good because it promotes human welfare, happiness, or some other end. The intuitionalist lays stress upon the fact that the appreciation of value is always immediate; he would say that the goodness of justice is recognized directly by our moral sense. In order to reach a true conclusion, it is necessary to take the testimony of both groups and sift in each the true from the false. Fortunately, we are greatly assisted in this by the fact that ethical discussions

have been, as a rule, very controversial, and that each school has given much attention to impeaching the testimony of the other where the other is at fault. As Socrates of old said, men differ in their beliefs with regard to the same thing because they see only a part of the truth. If, therefore, the testimony of each group is taken, and any error resulting from a partial point of view which fails to reveal the full nature of ethical judgment is eliminated, the remaining testimony when put together gives the whole truth. In this way it may be seen that the two schools of ethical thinkers are not essentially antagonistic, but supplementary to each other.

Between the extreme utilitarian and the extreme intuitionalist there are many types of ethical theory which are not so one-sided; these embody to a greater or less degree what is included in both schools. Since these intermediate views are true to the extent to which they embody the truth revealed by the two extremes and avoid the error of each, it is necessary to find the truth only in the extreme theories in order to get from ethics conclusive testimony with regard to the nature of the judgment of value.

The extreme, or hedonistic, utilitarian has his eyes fixed upon the fact that values are originally means of control. For this group we may let Herbert Spencer speak: "From whatever basis they start, all theories of morality agree in considering that conduct whose total results, immediate and remote, are beneficial, is good conduct; while conduct whose total results, immediate and remote, are injurious, is bad conduct. The happiness or misery caused by it are the *ultimate* standards by which all men judge of behavior. We consider drunkenness wrong because of the physical degeneracy and accom-

panying moral evils entailed on the transgressor and his dependents. Did theft uniformly give pleasure both to taker and to loser, we should not find it in our catalogue of sins. Were it conceivable that benevolent actions multiplied human pains, we should condemn them — should not consider them benevolent." [1] By such argument the extreme utilitarian makes it appear that the only thing of absolute value is pleasure, and that acts get their values only because they are in the service of pleasure.

Even the extreme utilitarian cannot ignore the fact that there must be some value which is not utilitarian, but absolute; which is not derived as means, but is known immediately through being felt. Pleasure may, in truth, be a purpose. When a man is at leisure, he may say to himself, "I wish to have an enjoyable time; what means shall I use to get pleasure?" Then he may decide to go fishing, to play golf or tennis, to ride in an automobile, to dance, to attend a banquet, or to read a book. It is true also that pleasure enters prominently into the worth of very many complex values when men are led to do things because the acts are agreeable as well as otherwise worthful. Moreover, it is true that the pursuit of pleasure appears to be an original, or primary, purpose, because it is desired when no possible explanation of why it is valuable can be made. However, in assuming that pleasure is the only philosopher's stone which turns acts into gold, the utilitarian has overlooked many other absolute values. In seeking the source of value, his attention is drawn into the wrong direction and centered upon pleasure, because when one desires a thing, there is a feeling of pleasure in anticipating it. His mistake becomes apparent in the light of the fact that

[1] Spencer, Herbert, *Education*, 1890, pp. 161–162.

one cannot get pleasure unless one is capable of having a desire for something else. This may be made clear by the following anecdote. An Englishman was seated on the bank of a stream, fishing. A native approached him and informed him that there were no fish in the stream, whereupon the Englishman replied that he was not fishing for fish, but for pleasure.[1] As Professors John Dewey and James H. Tufts say: "The fundamental fallacy of psychological hedonism has been well stated by Green to be supposing that a desire can be aroused or created by the anticipation of its own satisfaction — *i.e.*, in supposing that the idea of the pleasure of exercise arouses desire for it, when in fact the idea of exercise is pleasant only if there is already some desire for it. Given a desire already in existence, the idea of an object which is thought of as satisfying that desire will always arouse pleasure, or be thought of as pleasurable. But hedonism fails to consider the radical difference between an object's arousing pleasure, because it is regarded as satisfying desire, and the thought of a pleasure arousing a desire: — although the feeling of agreeableness may intensify the movement towards the object. A hungry man thinks of a beefsteak as that which would satisfy his appetite; his thought is at once clothed with an agreeable tone and the conscious force of the appetite is correspondingly intensified; the miser thinks of gold in a similar way; the benevolent of an act of charity, etc. But in each case the presence of the pleasurable element is dependent upon the thought of an object which is not pleasure — the beefsteak, the gold. The thought of the object *precedes* the pleasure and excites it because it is felt to promise the

[1] Paulsen, F., *A System of Ethics*, Tr. by Professor Frank Thilly, p. 255.

satisfaction of a desire."[1] In brief, the extreme utilitarian, through a false analysis, mistakes the pleasure in the desire for the object of the desire, whereas the pleasure exists in the desire only when something else is the object of the desire.

There is an overwhelming array of witnesses to refute the testimony of the hedonistic utilitarian where he makes the mistake of assuming that pleasure is the only ultimate source of worth. The self-indulgent man who gives himself up to pleasure-seeking soon finds that in order to get pleasure he must stimulate his jaded desires for other things, and that the more strenuously he seeks pleasure the less of it he gets, because through over-indulgence he destroys the desires for other things. The glutton, for instance, impairs his appetite and thereby decreases his pleasure in eating; in order to enjoy eating, he must stimulate his desire for food. Verily, many a man who has drunk the bitter dregs of life's cup can testify to the truth of the paradox of hedonism that to aim at pleasure is to miss it. But our witnesses do not come only from the ranks of sinners. The goodness of an act is greatly lessened in the estimation of men in general if the individual is found to have done it merely for the purpose of getting pleasure. History has demonstrated that the noblest path may lead through the Garden of Gethsemane to the crown of thorns and the cross, where the least suggestion that the motive is to secure pleasure, even in the world hereafter, is an affront to our sensibilities.

Hedonistic sophistry may assert that a good act, though painful in itself, may be undertaken because the individual desires the pleasure which comes from the

[1] Dewey and Tufts, *Ethics*, pp. 269–270.

approval of conscience. But conscience gives the pleasure of its approval because the act is felt to be worthy. The pleasure of conscience does not make the act worthy; conscience does not approve a good act because it is pleasurable to approve it, but because the act in itself is felt to be good.

Finally, can we believe that value depends upon pleasure alone when, in doing so, we must admit that all of the great characters who down through the ages have sacrificed themselves in a struggle to advance civilization have been deceived in their judgments of worth and have lived in vain? As Münsterberg says: "Has mankind at the height of the twentieth century really more pleasure than the savage tribe in the bushes? Has the man who is burdened with the responsibilities of highest culture really more pleasure than the shepherd who lies in the sun, and does the shepherd have more fun than the dumb beasts around him? Has not every step in civilization meant new difficulties and new problems, new conflicts and new responsibilities, new labor and new hardship? If pleasure is the goal, let us escape from civilization, let us throw off our proud achievements and let us learn from the herds of the meadow, which live for their sensual instincts." [1]

Here again, the hedonist is ready with his sophistry to assert that, although the pleasures of civilization are no more in quantity than those of savagery, they are higher in quality. But to assert that value depends upon anything else than the amount of pleasurableness is to deny the hedonistic standard, by recognizing a standard of worth that is not based upon pleasure, but upon something else which makes one pleasure better than another. This

[1] Münsterberg, Hugo, *Psychology and the Teacher*, p. 45.

something else is the value of the act with which pleasure is associated; and the worth of the act, therefore, gives value to the pleasure rather than the pleasure giving value to it.

In contrast with the utilitarian, the extreme intuitionalist has his eyes fixed upon the fact that worths are immediately appreciated. His belief is best exemplified by the popular idea of conscience, or the moral sense, as an infallible guide, which is supposed to know immediately the value of an act the first time the act is brought before it. "This theory holds that rightness is an intrinsic, absolute quality of special acts, and as such is immediately known or recognized for what it is. Just as a white color is known as white, a high tone as high, a hard body as existent, etc., so an act which is right is known as right. In each case, the quality and the fact are so intimately and inherently bound together that it is absurd to think of one and not know the other. As a theory of moral judgment, intuitionalism is thus opposed to utilitarianism, which holds that rightness is not an inherent quality but one relative to and borrowed from external and more or less remote consequences." [1]

It is true that ultimate ends are known only intuitively and that derived values are recognized by the individual through immediate appreciation. However, when the intuitionalist says that immediate appreciation is the only authority for the worth of all ideals, he does not look far enough to see that many values are not original, or primary, but derived.

The extreme intuitionalist points to human experience in support of his statements, but the very witnesses whom he calls to support his position make it clear that part

[1] Dewey and Tufts, *Ethics*, p. 318.

of his theory is not true. What a motley array of witnesses, — liars, thieves, adulterers, murderers, together with patriots, reformers, and saints! They all agree that a white color is white, but do they all agree as to the moral quality of the same act? There is scarcely a crime which was not at some time in the history of the race felt by individuals as a worthy act in the light of conscience, and the conscientious conflicts of the present day show that the moral sense is not an infallible authority. As soon as the saints attempt to reform the sinners, to create in them a new sense of what is worth while, they must begin to reason with them, and the moment they begin to reason about values, they turn their backs upon the intuitional doctrine, for to show the reason for a value is to show it to be worth while, not in itself, but rather as a means to some end upon which its worth depends. Indeed, ethical theory came into existence just because our immediate feelings of the values of acts are neither uniform nor absolutely reliable, and must, therefore, be supplemented by a rational attempt to find the values of acts in the light of the ends which they serve.

To sum up the evidence, the utilitarian has given unimpeachable testimony that many values are derived, but his testimony can be refuted when a failure to see that there are many ultimate ends leads him to say that only one exists. The intuitionalist has given unimpeachable testimony that some values are ultimately known only through immediate appreciation, but his testimony can be refuted when a failure to see the derived nature of many values leads him to say that intuition is the only authority. Putting together the parts of this testimony that must be accepted, we have the view of the matter which this chapter attempts to make clear; namely, that

some purposes are original, or primary, and that others are means of control to which feelings of value have been transferred from the ends that they serve.

Thus far, it must be understood, we have permitted only the extremists to testify. Many ethical thinkers who have taken intermediate positions are in substantial agreement with the conclusion advocated here. Those utilitarians who do not select some one special value, such as pleasure, for the ultimate worth from which all other values are derived, but who consider the ultimate end to be human welfare or perfection, are not blind to a part of the truth if they recognize the fact that since the will aims at definite, concrete activities, welfare or perfection is an empty abstraction, unless filled with a variety of concrete ultimate values. Those intuitionalists who hold that only general rules or classes of ends are known ultimately through immediate appreciation, are not blind to a part of the truth if they recognize that these general rules or classes of ends have significance only in that they designate groups of particular values each of which is felt to have absolute worth.

VII

According to natural science, the steps in the physical process which parallels the forming of a new purpose are: (1) a response to stimuli checked in its functioning; (2) a diversion of nervous energy into some channel of response not previously connected with this reaction, — a physical process by which the check may be removed; (3) an incorporation, through action, of the new response with the old habit. These steps are the physical counterparts of (1) the feeling of the value of some purpose, (2) the association with this purpose of some means for its realization, and (3) the use of the means in realizing the purpose. Natural science supports also the conclusion that some feelings of value are not derived from others, but are original, or primary.

Let us now see how natural science supports with its authoritative evidence the conclusion that has been presented from the teleological point of view with regard to how a new purpose is made. The physical counterpart of a purpose, according to natural science, is a response to stimuli checked in its functioning. Just as changes in the nervous system due to the stimuli of vibrating air and ether are accompanied by the consciousness of sounds and colors, and thus give "as in a symbolic language, news of the external world," so changes in the nervous system due to the reactions to these stimuli are accompanied, when checked in their functioning, by purposes, and thus give, as in a symbolic language, news of the responses to this world of external vibration. The light stimulus of an apple affects the nervous system of a child. As the result of nervous connections made previously, this stimulus tends to pass over into the response of eating. But if the fruit is on a table beyond the child's reach, or if he has to walk across the room or is otherwise delayed in getting the apple, the reaction of eating is checked in its functioning, although it may go even so

far as to make his mouth "water." Under these physical conditions, he feels a desire to eat the apple, he appreciates the worth of carrying out the action for which the nervous system has been set. If the reaction persists, if it is not abortive, the child feels a purpose.

Natural science would explain the illustrations given in the first part of this chapter [1] by saying that in such cases brain connections have been established between certain stimuli and the responses of locking the door, washing dishes, going to the office, and studying the principles of education; and that when evening comes and the man is in the upper part of the house, when the meal is finished and the housewife is engaged in conversation, when eight o'clock arrives and other activities interfere with going to the office, and when the hour for the study of the principles of education has struck and the student is at a distance from the library or is invited to go walking, the reactions for which the nervous systems of the respective individuals have been set, although started by appropriate stimuli, are checked, because the situations in which the individuals are at the time do not for the moment permit the completion of the reactions, or give stimuli setting off also other reactions which interfere with them. When the activity is obstructed, each feels a desire which makes him conscious of the end of his action and of its worth. If the tendency to the activity continues, the conscious accompaniment is a purpose.

Since a purpose is the conscious parallel of an obstructed reaction, a new purpose must be the accompaniment of a new obstructed reaction. The materialistic explanation of the steps in the making of a new reaction, a new

[1] Pp. 70–71.

habit of response, must point, therefore, to the physical counterpart of the making of a new purpose. Let us now examine the steps in the making of a new habit of response and then find their mental counterparts.

In the process of adjustment to environment, new habits of response are made as modifications in the nervous system. The usual steps in the physical process through which a new reaction is added to an old one are: (1) a reaction checked in its functioning; (2) a diversion of nervous energy into some channel of response not previously connected with this reaction, — a physical process by which the check may be removed; and (3) an incorporation, through action, of the new form of response with the old habit. The experiences of which these steps are the physical counterparts may now be found. (1) A reaction checked in its functioning is the physical counterpart of a purpose; (2) new reactions to the situation which may overcome the check are the physical parallels of the consciousness of means of control in the service of the purpose; and (3) the incorporation, through action, of the new response with the old habit is the physical parallel of the use of the means in the realization of the purpose.

Before the new response has been completely incorporated with the old habit, the old habit will be checked, in a greater or less degree, in the situation under which the new response first appeared, and the new response, although it now will appear more easily, will still have as its conscious accompaniment the idea of a means of control. When, however, the process has been completed so that the new response has become an integral part of the habit, this new part of the reaction, when checked, may be accompanied by a purpose which parallels it alone.

When the purpose is thus the accompaniment of only a new form of reaction, it appears as a new purpose. Natural science supports, in this way, the conclusion presented from the teleological point of view with regard to the process by which new purposes are made.

Interpretation with the use of illustrations may make the matter plainer. (1) When the individual, now regarded as a psychophysical organism, is writing and the process of writing is interrupted by the ink's ceasing to flow from his fountain pen, there appears in his consciousness a purpose revealing the character of the reaction somewhere ahead of the check. This purpose may be that of making the ink resume its flow. (2) Owing to certain physical conditions, nervous energy may be directed into channels producing the response of jerking the pen. On the side of consciousness, this jerking of the pen appears first as a means of control for carrying out the purpose. (3) The reaction of jerking the pen removes the obstruction and the original reaction of writing is continued. This process is paralleled by the feeling of an act of will in realizing the purpose. After this new reaction of jerking the pen has been fixed as a nervous connection, if it is called forth by the ink's ceasing to flow under conditions noted above and then checked in its functioning, because the stimuli from surrounding objects, for instance, set off reactions inhibitory to throwing ink, the purpose of jerking the pen appears. The acquired reaction has now become, when checked in its functioning, the physical condition for a new purpose, since there is an immediate feeling that jerking the pen is the thing that should be done.

Again, (1) the activity of a teacher may be checked in guiding a class from short to long division. This check

is paralleled in consciousness by a purpose along the line of activity; that is, to make the class understand the arrangement of divisor and quotient in long division. (2) There may be, under these conditions, the response of putting the divisor at the left and the quotient at the right in some examples in short division, instead of using the usual arrangement. This process appears in the consciousness of the teacher as a new means of control. (3) The difficulty is removed and the original reaction of guiding the class to the acquisition of long division, so far as the arrangement of divisor and quotient is concerned, is completed. This step is felt as an act of will, using the means of control in the realization of the original purpose. If the new form of presentation has become fixed as a connection between stimuli and response, and if, perchance, the reaction is called forth by appropriate stimuli and delayed in functioning by the absence of a piece of chalk, there may appear in the mind of the teacher the purpose of writing a quotient in the form employed in short division. The new reaction has now become, when checked in its functioning, the physical counterpart of a new purpose.

Natural science supports also the conclusion that the individual is endowed by nature with certain appreciations of worth, as well as with the ability to acquire new appreciations. Reactions are both original and acquired. Original reactions, which are called instincts, are nervous connections with which the individual is endowed at birth as the result of thousands of generations of evolutionary development. Many, however, are delayed in their functioning; for example, those which appear in adolescence; and many are "vague, variable, and rough-hewn," so that it is possible for the "instinctive tendency

to produce, not some one single habitual act, a replica of itself, but a number of different habits, each fitted to some special set of situations." [1] Acquired reactions are called habits. Now, original, or primary, values, the worth of which is immediately felt but cannot be explained teleologically by reason, are the accompaniments of instinctive reactions checked in their functioning; and acquired purposes are the mental counterparts of acquired reactions checked in their functioning. Furthermore, the transforming of an acquired purpose into a means of control for the purpose of explaining its value corresponds to the relating of an acquired reaction to the more fundamental response with which it was incorporated in overcoming an obstruction. When an original reaction is reached, obviously it cannot be viewed thus as a mere modification of a more fundamental response, and correspondingly reason finds here its limit in the explanation of value. The crude skeleton of an example, which disregards many connections, may be given for the sake of simplicity and brevity. A teacher is endowed by nature with an instinct to eat; teaching school is a modification of the activity of getting food; and the new method of going from short to long division is a modification of his activity in teaching school. If he explains in the everyday terms of teleology why he appreciates the value of the method used in teaching long division, he looks farther along the line of activity and shows that this method is justified as a means for attaining the end of teaching. If he is asked why he desires to teach, he looks farther along the line of activity and shows that this is a means for getting food. If he is asked why he feels the value of getting food, he explains that it is a means to eating. If

[1] Thorndike, E. L., *The Elements of Psychology*, p. 189.

he is asked why he appreciates the value of eating, and eating appears only in its pure, instinctive form, he can make no further explanation. In the instinct, the physical parallel of the ultimate or original value has been reached.

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PROBLEMS

1. What does a person lack who knows the right but does not do it?

2. *a.* Find in one of the standard magazines five advertisements each of which tends to create a predilection for some article by representing it as a means for attaining some value or values appreciated by the reader. *b.* Explain concretely how each advertisement creates a predilection for the article advertised.

3. Name five ideals you have attained because you have associated the acts represented by them with the securing of mere social approval.

4. Name five purposes you have attained because you have associated the acts represented by them with desirable ends other than that of social approval.

5. Ask five individuals why they believe that a person should be truthful and honest, and decide from the answers given whether

the values they feel for these virtues were derived from the securing of mere social approval or in part at least from intrinsic ends which truthfulness and honesty serve.

6. *a.* Who has had the strongest moral influence upon you? *b.* How do you explain this influence?

7. Why is the conscientious explanation we make of our reason for doing some act often inadequate?

8. Why is our immediate feeling that an act is wrong usually a better guide for conduct than later reasoning which makes the act appear right?

9. If children do not coöperate for social ends in the home and school, should we expect them to have strong social ideals when they become adults, even though they study about these ideals? Give the reason for your answer.

10. Explain the statement that the best way to get pleasure or happiness is to forget it.

CHAPTER V

HOW NEW MEANS OF CONTROL ARE MADE

New means of control are made through finding new uses for things in carrying out purposes. The essential steps in the complete process by which a new means of control is made, are (1) experiencing some difficulty in realizing a purpose, (2) defining the problem which must be solved in order to overcome the difficulty, (3) solving the problem, and (4) using the solution in overcoming the difficulty. The problem is defined and solved by the use of hypotheses made through analogy and tested in thought or in action, or in both. The uses of things as means of control constitute the meanings of the things. These meanings become so closely associated with the things as to appear inherent in them.

I

New means of control are made through finding new uses for things in carrying out purposes. The essential steps in the complete process by which a new means of control is made, are (1) experiencing some difficulty in realizing a purpose, (2) defining the problem which must be solved in order to overcome the difficulty, (3) solving the problem, and (4) using the solution in overcoming the difficulty. The problem is defined and solved by the use of hypotheses made through analogy and tested in thought or in action, or in both.

When a new difficulty arises in carrying out a purpose, a new means of control competent to overcome this difficulty is sought. As a rule, this new means does not spring into consciousness with the seeming spontaneity that marks the appearance of a purpose, but is the result of a process of which the individual may be directly con-

scious. To find, through an analysis of this process, how purposes and means of control already in experience work together to make new means of control, is the problem of this chapter.

Means of control, as we have learned,[1] appear in the form of things; for example, a drinking cup, a pencil, a law of physics, printed in a book, or a rule of grammar, likewise evident. Things become new means of control, obviously, when new uses are found for them in giving the control necessary to bring about the realization of purposes. How the individual finds new uses for things may be shown by illustrations.

Imagine the case of a person who, for the purpose of writing a letter, applies his fountain pen to the paper and finds that the pen does not make a mark. If he knew by what means the ink could be made to flow from the pen, he would use this means, and the writing would be resumed. But he does not know what means to use. (1) *He has thus projected a purpose and met with a difficulty in realizing it.*

The individual now sets about to locate definitely the difficulty. Perhaps, he imagines, there is no ink in the penholder; but he remembers that the holder was filled only a half hour before. Perhaps the tube that conducts the ink from the holder to the pen point is misadjusted; but examination reveals that it is in the proper position. Perhaps this feed tube is clogged with dried ink. Let us assume that all evidence, such as the facts that the pen has not been used for a long time and that the tube appears to be stopped up, points to this as the location of the difficulty. The individual then becomes conscious of a definite problem; namely, What means may be used

[1] P. 52.

to remove the ink from the feed tube? (2) *The difficulty has thus been located and given the form of a definite problem.*

A problem appears when the individual is conscious of a purpose, but not of the means for its realization. The purpose marks, or defines, the problem, which appears in the form of the question, How can this purpose be carried out? When the means of writing fails, the problem which first appears may be expressed by the question, How can the writing be done? In this form, however, the problem is vague and general, — it is not *well defined.* In order to define it better, to make the difficulty more clear and specific, the individual must find a purpose which lies in the line of action immediately beyond the difficulty. In the illustration, this is the purpose of removing the dried ink from the pen tube. It marks definitely what must be accomplished in order to overcome the difficulty; and for the time being it takes the place of the purpose of writing the letter. If the problem is complex, — that is, if several means of control must be found in order to overcome the difficulty, — this complex problem must be subdivided into simpler ones, each of which is defined by a purpose immediately ahead of each means of control needed.

The method of defining the problem, as can be seen from the illustration, consists of making hypotheses, — that is, imagining what may be the difficulty, — and testing these hypotheses to determine whether they are true. Hypotheses are suggested through similarity of the new situation in which a difficulty has arisen to other situations in which the difficulties have been defined. The fact that one cannot drink lemonade through a straw tube if the lemonade has been exhausted from the glass, or if the straw tube is misadjusted, or if the straw tube is

clogged by pulp or by a seed, may suggest the hypotheses given above in the illustration; or generalizations made from a number of similar instances where the passage of some substance through a tube is concerned, may suggest them. Hypotheses may be tested both in thought and in action. Testing in thought is trying the hypotheses in imagination and consists in calling to mind facts that agree or conflict with the hypotheses. When the individual in the illustration calls to mind the fact that he has filled the pen only a half hour before, he tests an hypothesis in thought and finds it untrue, because this fact conflicts with it. The hypothesis that the feed tube is misadjusted is tested in action by examining the tube.

When the problem has been defined, the individual may have in his stock of means of control previously acquired one that will overcome the difficulty. In this case, he can make use of it without further delay. But if he does not know how to overcome the difficulty, he must proceed to find a new means of control. In other words, (3) *he must solve the problem.* As in the case of defining the problem, this is done by making hypotheses, and testing them in thought or in action, or in both. He has used a pin to pick lint from the opening in the end of a small key and, because of the similarity of the two situations, imagines that the obstruction in the pen tube may be removed with a pin. When this hypothesis is tested in imagination, he sees that the tube is so small that the pin cannot be inserted into it. An attempt may be made actually to insert the pin into the tube, especially if the test in thought is doubtful. Testing the hypothesis in imagination, if conclusive, is better than testing it in action, because testing in imagination saves the time and energy necessary to get the pin and avoids the danger

of injuring the tube by an attempt to force the pin through it. The removal by blowing of fruit pulp or a seed obstructing a straw may now suggest through the similarity of the two situations that the dried ink may be removed by blowing through the feed tube. Trying this in thought, the individual finds the hypothesis useless, in view of the fact that dried ink adheres so closely that it cannot be dislodged by blowing. If this test in thought is not convincing, he may test the hypothesis actually by trying to blow through the feed tube, with the probable result either of losing time in washing the tube or of getting ink upon his lips. The fact that he has cleaned small glass bottles and other things with water, or the generalization from such experiences that water is a solvent, suggests, through similarity of the two situations, that perhaps water may be the means of removing the clogged ink. This hypothesis is tried in imagination and found apparently to work. Testing in action may be done by putting the tube into water and finding that the ink begins to dissolve.

When the hypothesis that water is a means of removing the dried ink from the tube has been tested and found to solve the problem, the ink is removed and the realization of the purpose of writing the letter continued. In other words, (4) *he uses the solution of the problem in overcoming the difficulty.* This fixes the new means of control in the experience of the individual so that, when the same kind of difficulty occurs with a pen, it will not be necessary for him to go through the process of inventing a means of control for overcoming the difficulty; for he will have stored in memory and ready for use the fact that water is a means of removing dried ink from the feed tube. Also, when he meets a new kind of difficulty that bears

some resemblance to this one, his experience with the clogged feed tube may, through analogy, suggest hypotheses which will define the problem or become the basis of solution in the case of the new difficulty.

Let us consider next an illustration where, in carrying out the purpose of writing, the individual did not experience a mechanical difficulty, but experienced the difficulty of not having some of the general ideas which the writing required. This illustration has been selected in view of the facts that it is an account of an actual rather than of an imaginary experience; that a first-hand knowledge of the details is available; that it may be stated briefly, owing to the reader's familiarity with the contents of the previous chapter; and that it will afford, with new motivation, a review of the essential ideas of the previous chapter.

Some years ago, when the author began to teach the principles of education, he had the purpose of writing an outline of the course. It was evident that principles for controlling the process through which new purposes are made should be included in the outline, because the school, in order to make the pupils socially efficient, must guide the development of their purposes as well as the development of their knowledge of the means through which purposes can be realized. When, however, the place was reached for stating these principles, a difficulty was met, because the writer had not in his previous experience acquired them in definite and usable form. (1) *Thus a difficulty was met in carrying out the purpose for which the writing was begun.*

An hypothesis was made that perhaps purposes are given by nature through intuition, that they spring spontaneously into consciousness, and that the way in

which they are made cannot, therefore, be found. This hypothesis was rejected when tested in the light of several facts, as follows: We live, according to natural science, in a world of uniformity, a world of law, and if new purposes appear, there must be some antecedents necessary to their appearance. It is a matter of common experience that a child may be put under influences which will develop in him good purposes, or he may be put under influences which will develop in him bad purposes. The development of his appreciations of value may, therefore, be controlled. Again, since literature and the other fine arts lead the individual to form new purposes by developing in him appreciations of value, there must certainly be some principles in accordance with which the fine arts do this, principles which not only reveal the essential nature of the fine arts, but also may guide in the teaching of them.

It was known that the steps in the development of new means of control could be found through an analysis of the self-active process — the process of projecting purposes and realizing them. This fact suggested the hypothesis that the making of new appreciations of value could be explained with relation to the same process. The hypothesis was accepted as true, because individuals acquire new purposes in the activities of everyday life, where they are concerned with realizing values through means of control. This was the first step in narrowing the problem.

The fact that difficulties in getting other ideas had been overcome by making analyses of the objects under consideration, and the fact that analyses in other instances had been made simpler by graphic representation, led to the hypothesis that analysis through the use of graphic

symbols should be used here. This was tested by trying it. The self-active process was represented thus:

P = present condition of the self
M = means of control
I = ideal condition of the self (purpose)

I was analyzed and found to consist of a form of action plus a feeling of its value for the self. M was examined and found to consist of some form of action. Since both M and I are ways of acting, if M could acquire a feeling of value so that it would be felt worth while in itself, it would become a purpose. Since there seemed to be no other way for the new purpose to appear, (2) *the problem was tentatively defined* as follows: How can a means of control get an immediate rather than an instrumental value?

(3) *In solving the problem,* the hypothesis that a means of control may acquire value from the end which it serves, appeared as the result of analogous situations in which things acquire values from objects of value associated with them. Mere clods of dirt, to which a person would ordinarily be indifferent, are regarded with feeling, if they mark the grave of a friend. Numerous things, such as relics, incite an emotional glow from the fact that they have been associated with other things that appeal to the emotions.

This hypothesis was tested in thought. The first test was made in the light of psychology. In the psychological explanation of desire, which involves the appreciation of the value of some object for the self and is essential, therefore, to a purpose, it was found that desire arises when an habitual reaction, called forth by stimuli, is obstructed in its expression. It was found also that new habits, which form the physical accompaniments of new purposes, appear first as means of getting around

obstructions in the functioning of old habits, which form the physical accompaniments of old purposes. New purposes, consequently, must appear first as means of control in the service of old purposes.

The hypothesis was tested also in the light of ethics, which is a science of moral values, and has developed as the result of many centuries of thought. The utilitarian theory was found to give evidence in favor of the hypothesis that purposes are originally means of control, but this evidence was apparently nullified by the fact that the intuitional theory did not support this hypothesis. The authority of ethical thinkers could not be accepted, so long as their testimony conflicted with regard to the matter under consideration. Here arose a new difficulty, which was overcome through finding a means by which the testimony of the utilitarians and intuitionalists could be harmonized. When this had been done, ethics appeared to support the hypothesis. Overcoming this new difficulty required the four steps in the process for making a new means of control. In taking these steps, much assistance was received, of course, from books on ethics.

After the hypothesis had been tried still further in the light of a number of facts of common experience, a final test was made by applying it to the explanation of the function of the fine arts and of the essential steps in teaching them. The hypothesis was applied first in making an explanation of the nature of the *Twenty-Third Psalm* and of the methods of teaching it.[1] This explanation was verified by comparison with a successful attempt to bring out the value of this psalm in a booklet entitled *The Song of Our Syrian Guest.*[2] Facts learned about

[1] See pp. 219–221.

[2] By William Allen Knight; The Pilgrim Press, Boston.

the teaching of literature through practical experience in teaching this subject in a high school seemed to support the hypothesis. After further apparently satisfactory applications to the fine arts,[1] the hypothesis was accepted as the proper solution of the problem and (4) *was used in continuing the writing of the outline.*

As a third illustration, let us consider a case in which the difficulty was to find the special use of a thing. Several years ago, a young man received as a Christmas present a piece of cloth which was a yard or more square, had a small hole in the center, and was adorned with needlework. On opening the package, he stared inquiringly at the contents, an evidence of his difficulty, and then said, "What is this thing?" (1) *He had experienced a difficulty in carrying out the purpose* of assigning to the decorated cloth some special use for which the donor evidently intended it. (2) *He then reduced the difficulty to the definite problem,* What special use could a man make of the cloth? This problem was suggested by the fact that other presents he had received were for his personal use, and the suggestion seemed to be reasonable. (3) *In his attempt to solve the problem,* the first hypothesis, resulting from analogy, was that the cloth might be a stand cover, but this hypothesis was set aside in view of the fact that a stand cover would not have a hole in the center. The analogy which gave rise to the hypothesis that solved the problem was as follows: The young man's roommate had a bag to cover a dress suit when hung in a closet, in order to protect the suit from dust. After the suit had been put on a combined coat and trousers hanger, the bag was slipped over it from the bottom and confined about the hook of the hanger with

[1] See pp. 227–236.

a draw string. The shape of the cloth with a hole in the center resembled the bag, if the bottom of the bag were not considered. This analogy led to the hypothesis that the purpose of the cloth might be to protect a suit of clothes from dust. The size and shape of the cloth, and the hole in the center through which the hook might pass, were evidence of the truth of this hypothesis. In other ways, the hypothesis was tried in thought and found to stand the test. The recipient of the present accepted this meaning as a fact, and (4) *thus his purpose of finding the use of the thing was realized.*

From these illustrations, the steps in the making of a new means of control appear to be as follows:

1. Experiencing a difficulty in realizing a purpose
2. Defining the problem which must be solved in order to overcome the difficulty
   - (*a*) by making hypotheses based upon analogy
   - (*b*) by testing hypotheses { in thought / or / in action
3. Solving the problem
   - (*a*) by making hypotheses based upon analogy
   - (*b*) by testing hypotheses { in thought / or / in action
4. Using the solution in realizing the purpose

It is true that the process through which new means of control are made is often abbreviated, because two or more of the steps coalesce. A person may define the problem as soon as he has felt the first difficulty; he may grasp the solution as soon as the problem has been defined. These abbreviated cases do not, however, concern us

here. The analysis of the process is made, as we shall learn definitely later, for the sake of finding how it can be controlled. So long as the process, having been started aright, runs effectively in forming a new means of control, there is no occasion for interfering with it. Direction is necessary only when there is a difficulty in the process, and whatever difficulty appears will be in taking one of the steps given above. A knowledge of all of the steps in the complete process is necessary as a basis for locating quickly and accurately whatever difficulty there may be, and for finding what kind of assistance would be most effective.

II

The method of scientific investigation supports our conclusion with regard to the essential steps in making a new means of control.

Logical method as expressed in the method of scientific investigation supports the conclusion that has been reached with regard to the essential steps in making a new means of control. Natural science is concerned with finding efficient causal connections, or, in other words, the uses of things. In creating new means of control, the method of science has produced remarkable results. The discovery of this logical method was nothing more than the discovery of the way in which man's mind has always worked in creating new means of control. Knowing the way in which mind works, one is able to get better results by deliberately and precisely directing the steps necessary to successful investigation. The steps essential to scientific investigation, which have been found through the study of logic and used successfully in the scientific laboratory, are the same as those given above. The scientist does not merely look about

for truths and pick them up when he sees them, as a botanist in field work adds rare plants to his collection. He must have some purpose in his investigation; he must define a problem which marks a difficulty in attaining this purpose; and he must solve this problem by making and testing hypotheses, which come to his mind as the result of analogies. The hypothesis that stands the test, that overcomes the difficulty, is accepted as truth, and the world learns that a new scientific fact has been discovered.

III

The process through which a new means of control is made gives emphasis to reason, whereas the process through which a new purpose is made gives emphasis to feeling.

Are not the steps in the complete process of making a new means of control a mere amplification of the ones given in the previous chapter as essential to the making of a new purpose? Is not the value of the purpose felt in the first step, a means for its realization associated with it in the second and third, and the means used in the realization of the purpose in the last step? This is true; but the effects of the two processes are quite different. In the making of a new means of control, defining and solving the problem require nearly all of the individual's attention and put him in a reasoning state of mind. Thought and feeling are more or less exclusive; they cannot both occupy the center of the stage at the same time. Thought chills feeling and feeling confuses thought. At the conclusion of the process of making a new means of control, the rational attitude is predominant, and reason gives emphasis to the instrumental nature of the new means that has been found. On the other hand,

in the steps for the making of a new purpose, feeling is predominant. Only a flash of association between means and end gives reason a very minor part to play. The feeling of value which is to be transferred from the end to the means occupies the center of the stage. The one process develops a new means of control, and the other adds value to this means of control after it has been developed.

IV

The most difficult steps in the process of making a new means of control are forming the hypothesis which defines the problem and forming the hypothesis which solves the problem.

In the process of making a new means of control, the most difficult steps are finding, upon the basis of analogy, the hypotheses necessary to locate the problem and form the solution. The ability to use analogies William James calls sagacity, and says of it in connection with the forming of new means of scientific control created by Newton and Darwin: "The flash of similarity between an apple and the moon, between the rivalry for food in nature and the rivalry for man's selection, was too recondite to have occurred to any but exceptional minds. *Genius, then, . . . is identical with the possession of similar association to an extreme degree.* Professor Bain says: 'This I count the leading fact of genius. I consider it quite impossible to afford any explanation of intellectual originality except on the supposition of unusual energy on this point.'" [1] Every one has this ability, of course, to some degree. As James brings out, the genius differs from the ordinary man by having such ability to an extreme degree.

[1] James, William, *The Principles of Psychology*, Vol. II, p. 360.

That one individual, in a short life span, can acquire knowledge which has been developed only after centuries of thought by the most capable men of the race, is due to the fact that these difficult steps in acquiring knowledge are made easy for him. Forming the hypothesis on the basis of analogy is "going from the known to the unknown." Uses which the individual knows for things are thus made into new means of control, which were hitherto unknown to him. When once a successful hypothesis has been found, the basis from which it came through analogy can be pointed out easily and quickly to the learner. The bridge to the new knowledge is placed clearly and definitely before him. It may require the genius of a Newton to see the "similarity between an apple and the moon," and it may require the genius of a Darwin to see the "similarity between the rivalry for food in nature and the rivalry for man's selection," but after either hypothesis has been made, it is easy to indicate the analogy to the common man in such manner that he can see it. Since only hypotheses that have borne the test are pointed out to the learner, he is saved, moreover, the enormous amount of time and energy necessary to make and test unsuccessful hypotheses.

V

The use of a thing as a means of control constitutes the meaning of the thing.

The use of a thing as a means of control constitutes the meaning of the thing. This is true whether the thing is a pen, a chair, a table; or whether it is the word *vertebrate*, the statement of the law of gravitation, or an account of the theory of evolution. Children's definitions emphasize the fact that use constitutes meaning, as, for

example: "nail is something to put things together;" "pickle is something green to eat;" "ring is what you wear on your finger;" "a knife is to cut meat."[1] A thing has as many meanings as it has uses. To a child, water may appear both as something to drink and something in which to take a bath.

Dictionary definitions, representing the experience of mature persons, give further support to the fact that use constitutes meaning. According to the *Standard Dictionary*, a pen is "an instrument for writing with a fluid ink; formerly made of a quill, pointed and split, but now usually of metal and fitted to a holder; by extension, both pen and holder united." This definition includes both the function, or use, and the structure of the pen. The structure must be given in order to make the symbol of the thing more definite, for the thing involves both a symbol and a meaning. The structure gives also further uses, in so far as the individual knows uses for a "quill pointed and split," for "metal," and for "handle."

An adult has, under normal conditions, acquired many more meanings for a pen than a child has acquired for it. A pen may be used to prop up a window, to pick dirt out of a crevice, to make a hole in a paper, to hold a loop in an electric wire so as to raise the light, to make a tapping sound in attracting some one's attention, to hold down a person's tongue in examining his throat for evidence of inflammation, etc. It is obvious that a dictionary could not practicably mention all of these uses. The dictionary gives, therefore, the common use and indicates other uses, as well as the symbol, by describing the structure. The statement of structure carries with it as many meanings as the reader has found for that kind of structure.

[1] See Bagley, W. C., *The Educative Process*, p. 79.

When the meanings, or uses, of a thing are manifold and one does not stand out more prominently than others, the dictionary definition cannot be other than structural. To a boy, a stone is something to throw, but the important uses to which men put stones are so many that a dictionary could not practicably record all of them. A stone is defined, therefore, as " a small piece of rock, as cobble or pebble." Rock is defined as " the consolidated material forming the crust of the earth or any representative portion of it," etc. In the terms of these definitions, the reader recognizes symbols together with uses which he has found for the things symbolized. The dictionary definition of water is " a colorless limpid liquid compound of hydrogen and oxygen (H_2O) in the proportion of two volumes of hydrogen to one of oxygen, or by weight 2 parts of hydrogen to 16 of oxygen." Here again, " limpid liquid," " hydrogen," and " oxygen " convey the meaning of water only to the extent that the reader knows uses for such things. Liquid, hydrogen, and oxygen have meaning and can make the definition significant only in so far as the reader knows what they do, how they act, and, therefore, how they can be used in control. The experiments of a chemist in finding meanings for these substances bear witness to this fact; for he seeks to find how they act.

A word is a physical thing; it can be seen in a book or heard in conversation. The special meaning of a word is the special use people make of it as a symbol. Words bear meanings in definite form and their meanings are kept alive by frequent use. They are especially valuable in such matters as solving problems and communicating meanings, because they can be produced at will. The great superiority of man over the lower animals has been

attributed in a large measure to the advantage which the use of words has given to him. Because he can use such arbitrary signs of meanings, man has been called the symbol-making animal.

VI

There is a common stock of original meanings for things, and to these original meanings acquired meanings are added.

Just as nature supplies the individual with an original stock of values, which are the bases for the making of other values, so nature supplies the individual with an original stock of meanings, which are the bases for the making of other meanings. The simplest meaning which a thing can have, and one which is common to all individuals, is that of something to be looked at, listened to, smelled, touched, or sensed in some other way. The thing is thus recognized as a means for giving certain sensations. A child and an adult, a savage and a civilized man, all recognize a watch as a thing to be looked at; nature gives this meaning to them all. But in addition to this, the watch may have other meanings that depend upon other uses to which it may be put. In addition to being a mere ornament, a mere object to be looked at, it is a means for telling time, a means for testing the acuteness of hearing, etc.

Although a thing may have many meanings for a person, he is not necessarily conscious of them all when he looks at the thing. Very often only the simple meaning of something-to-be-looked-at is prominent in consciousness, while the relations of the thing to other purposes for which it has been found serviceable appear only as a fusion of appreciations transferred from the ends served, rather than as definite conscious plans of action.

VII

A thing involves sensations, which are united by the meaning as sensations of the same thing.

Besides the meaning, a thing involves sensations with which the meaning is intimately associated. An object appears in the distance silhouetted against the sky on the horizon. The observer says, "I see an automobile." Reduced to its lowest terms, what he really does see is a certain contrast of light and shade, which bears for him the meaning of automobile. If at night, a bright light appears in the distance, he may say again, "I see an automobile." What he really sees now is a bright light. Under other conditions, he may say that he hears or smells an automobile, when he hears only a sound and smells only an odor. That a person should recognize anything more than the sensation, is due to the fact that he has a ready-made meaning which he associates with this sensation. What is true of the experience of an automobile is true of the experience of any other thing.

Sensations are recognized as belonging to the same thing when one meaning is common to all of them. A certain form and color, the odor of gasoline, the chug of an engine, the noise of a horn, may each be the sensation symbol of an automobile. Because all of these sensations have a common meaning, they are recognized as belonging together as sensations of the same thing.

As the result of various meanings involved, what would otherwise be a confusion of sensations group themselves into various orderly units, each of which is recognized as a thing, such as a chair, steam radiator, piano, table, clock, doorknob, vase. As this paragraph is being written, the author has a complex of sound sensations. Some

of them group themselves as meaning a unitary thing called a piano; others as meaning a heavy wagon passing on the street; others, people talking; and still others, a carpenter hammering nails. Various sounds are thus grouped together as sounds of the same thing, because they have the same meaning. In a factory, an inexperienced visitor may hear only a confusion of sounds, while the experienced machinist, accustomed to the factory, hears various machines or parts of machines. He has attached to the sounds certain meanings other than the common meaning of something to be heard. Likewise, when a person listens to others conversing in a language unfamiliar to him, he hears only a confusion of rapidly uttered sounds, because for him these sounds are not combined in meaningful groups.

Whatever is distinguished as having a unitary meaning appears as a thing, no matter how manifold are the sensations of it. A whole city, a house, or a brick in the house may be regarded as a thing when it involves one meaning. One grain of sand or the whole world, indeed, may each appear as a thing when it is considered to have a unitary meaning.

VIII

There is a mistaken popular belief that meaning is inherent in the thing.

In the study of how new purposes are made, it was found that an acquired value becomes so intimately associated with a thing that a person seems to see the value as in inherent quality of the thing.[1] A person first finds honesty valuable because it is a means to valuable results, but later the value of the results becomes so intimately

[1]See pp. 72–74.

associated with the means that he seems to see intuitively that honesty is a thing worth while. After a person has acquired a new meaning for a thing by finding a new use for it, this meaning likewise becomes so intimately associated with the thing that he seems to see it immediately, to apprehend it intuitively, as inherent in the thing itself. As in the case of a word, we first associate intimately the meaning with the symbol and then seem to recognize this meaning immediately when the symbol appears.

Owing to this fact, it is natural that in popular tradition there should be not only the mistaken belief that value is an inherent quality of the thing,[1] but also the mistaken belief that meaning is inherent in the thing. The truth of the matter is that if the individual sees immediately in a thing any other meaning than would be recognized by a child or a savage, he sees this meaning in the thing because he himself has first put it there. Just as truly as he has put value into things by associating them through use with valuable purposes, he has put meanings into things by finding new uses for them in the service of purposes. That the meaning of a thing is not inherent in it, but is derived from the use of the thing as a means of control, is a basal idea of modern pragmatic philosophy.

[1] See p. 89.

IX

The steps recognised by natural science as essential to the making of a new response, which is the counterpart of a new meaning, are the physical parallels of the steps we have found essential to the making of a new meaning. According to natural science, the counterparts of meanings with which the individual is endowed by nature are inborn connections between stimuli and responses, and the appearance of acquired meaning as inherent in the thing is a manifestation of habit.

Turning now to natural science, we shall find that it supports our conclusions about the making of a new means of control. A knowledge of the use, or meaning, of a thing is an accompaniment, according to natural science, of the strain sensations involved in the reaction to stimuli. As Professor Bagley says: "The use to which sensations are put determines their significance to the organism — determines, in other words, their meaning. A stimulus is presented to an infant and reaction follows. The stimulus becomes a sensation; that is, the infant is 'conscious' of it in a vague, incoherent fashion. A reaction follows upon the stimulus, *but the initiation of the reaction is unconscious;* that is, it follows instinctively or reflexly upon the stimulus and would have taken place even though the stimulus had not entered consciousness as sensation. But this instinctive reaction is also reported to consciousness through the agency of the strain sensations arising in the tendons; the muscular adjustments to which the stimulus gave rise are made data of the child's consciousness and become fused with the original sensations which the stimulus aroused. Repetitions follow, and this association between the sensation occasioned by the stimulus and the sensations occasioned by the instinctive adjustment to the stimulus becomes firmly fixed. Gradually

the stimulus loses its vague and incoherent character. It comes to 'mean' a definite sort of response, the satisfaction of a definite need." [1]

If knowledge of use, or meaning, is the accompaniment of a response, knowledge of a new use, or meaning, is the accompaniment of a new response. In its account of the steps through which a new response is made, natural science supports our conclusions, for the steps it finds essential to the complete process of making a new response are the physical counterparts of the steps we have found essential to the complete process of making a new means of control. According to the materialistic explanation, the essential steps in the making of a new response are as follows:

1. Some habitual response is checked in its functioning. Because energy, according to natural law, follows the line of least resistance, nervous energy is diverted from the ready-made channel of habitual response to some new channel only when it meets an obstruction. When the habit of writing is checked by conflicting nervous activity due to stimuli caused by the unmarked paper over which the pen has passed, there is a check in the response of writing.

2. Reaction is directed towards the several parts of the situation until checked by the disturbing element, which constitutes a part for which no adequate response has been acquired. When the main channel is blocked, nervous energy, following the line of least resistance, is diverted into those channels which are partly opened as a result of their connection with some of the stimuli in the situation. To the degree that situations have stimuli in common, they are similar; and, as Professor Thorndike

[1] Bagley, W. C., *The Educative Process*, p. 68.

says, "To any situation for which neither nature nor nurture provides a response the response will be that which they provide for the situation most like it."[1] In the case of a very immature organism, the reaction that appears when an habitual response is checked may be quite random. This is due to the fact that the very immature organism has not developed reactions to closely similar situations. In the case of a more mature organism, however, the reactions tend to be directed towards various parts of the situation, until the disturbing element is met. This is true because the organism has acted in this way in similar situations.

This kind of reaction is determined by natural law, because it is the simplest way leading to the reaction which overcomes the check, and the way, therefore, most frequently taken, according to the law of chance. As such channels increase in number, owing to many experiences of this kind, there is a greater predisposition of the organism to respond in this way to new situations. This kind of response runs smoothly, so long as the organism is adjusted easily to the several parts of the situation, but is checked abruptly when the disturbing element is met, for the disturbing element makes a part of the situation for which the organism has acquired no adequate response. In situations similar to that in which the response of writing was checked, reactions had been directed to the several parts of the situation, so nervous energy, flowing through channels partly opened by similarity of stimuli, found the same form of expression here. This manner of reaction ceased when the feed tube of the pen was reacted upon and a check was experienced, because the condition of the feed tube formed

[1] Thorndike, E. L., *The Elements of Psychology*, p. 211.

a situation for which no appropriate response had been acquired.

If nervous energy is diverted into a channel that leads at once to overcoming the check, the process is abbreviated, and the directing of activity to various parts of the situation does not appear. We are making, however, an analysis of the complete process, where all of the steps stand out clearly.

Tendencies to reaction through channels partly opened by similarity in stimuli may reach complete expression in outward act, or they may be affected by other incipient tendencies to activity, so that they do not reach such complete expression.

3. Response is turned directly towards removing the check. Following the line of least resistance, nervous energy takes this form of expression, when reaction to the several parts of the situation is blocked by stimuli from some part for which no adequate response has been acquired.

When one channel does not lead to the removal of the check, nervous energy flows on into others until the check is removed. The stimuli of the situation seed-in-straw-tube was connected with the response blow-through-tube; the stimuli of dirt-in-bottle was connected with the response wash-bottle-with-water, etc. Owing to the fact that these channels are partly opened by similarity of stimuli in the situation dried-ink-in-feed-tube, nervous energy is now diverted into these channels, and, as a consequence, the organism will tend to blow through the tube, wash the tube with water, etc. Thus does the nervous force go from one channel to another until the check is overcome.

These tendencies to reaction, as in the case of the

second step, may reach complete expression in outward act, or they may be affected by other tendencies to action so that they do not have such complete expression.

4. The check is overcome and nervous energy follows the open channel of the response of writing.

The mental steps which parallel these physical ones are as follows:

1. An habitual response checked in its expression is, as we have learned,[1] the parallel of a purpose.

2. Reaction directed towards the several parts of the situation until checked by the disturbing element, is the counterpart of defining the problem. When the disturbing element is met and, because no adequate response to this element has been acquired, the reaction is checked, a purpose appears in consciousness. This purpose marks a problem. When a purpose appeared in the first step of the process, it marked the problem very indefinitely, but the purpose now in consciousness as an accompaniment of a checked reaction towards only a part of the situation, makes the problem more definite, for this purpose lies immediately beyond the new means of control needed.

Tendencies to reaction through channels partly opened by similarity of stimuli correspond to hypotheses based upon analogy. They are hypotheses because subject to check by later activity or tendencies to activity, if they are ineffective in bringing adjustment. If they reach complete expression in outward act, their effectiveness in bringing adjustment is tested in action; if they are affected by other incipient tendencies to activity so that they do not reach such complete expression, they are tested only in thought.

3. When activity is turned directly towards removing

[1] See p. 93.

the check, it is obviously paralleled by consciousness of solving the problem; or, in other words, of finding a new means of control for overcoming the difficulty. As in the case of the second step, this process is paralleled by the consciousness of hypotheses tested either in action or in thought.

4. As the check is overcome and nervous energy follows again the open channel of the habitual response, the individual is conscious of using a new means of control, which is the conscious parallel of the new response, in the service of a purpose, which is the conscious parallel of the habitual response checked in its expression.

From the materialistic point of view, the basis of meanings with which nature endows the individual is found in the form of instincts, inborn connections between stimuli and responses. The simple meanings given by nature and common to all individuals are based upon instinctive responses, such as fixing the eyes upon or turning the ear towards some object. These are paralleled by the consciousness that the object is something to be looked at, listened to, or used in some other instinctive way.

Since there can be no stimuli without response, there can be no symbol without meaning. The symbol of a thing is the sensation which accompanies the immediate effect of the stimuli. This invariably passes on into reaction, which is the counterpart of meaning.

The fact that meanings acquired for a thing become so closely associated with it that they seem to be recognized intuitively as inherent in the thing, is explained in the natural science account of perception.

There is more to perception than passive impressibility by external forces. Every act of perception is really an act of association.

What is felt depends not only upon how the afferent neurones are stimulated, but also upon what neurones they in turn arouse; not only upon what the external object is, but also upon (*A*) the past experiences and (*B*) the present tendencies of the individual who perceives it.[1]

Every perception is an acquired perception. Perception may then be defined, in Mr. Sully's words, as that process by which the mind "supplements a sense-impression by an accompaniment or escort of revived sensations, the whole aggregate of actual and revived sensations being solidified or 'integrated' into the form of a percept, that is, an apparently immediate apprehension or cognition of an object now present in a particular locality or region of space."[2]

This association of meaning so intimately with the thing as to make the meaning appear inherent in the thing is one of the manifestations of habit, through which "the neurones they in turn arouse" become so intimately connected with the neurones first stimulated that nervous energy flows without interruption from one to the other. As they become the direct unitary effect of the stimulation on the physical side, they appear to be the direct unitary effect of the presence of the object on the mental side.

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[1] Thorndike, E. L., *The Elements of Psychology*, p. 226. The italics are mine.

[2] James, William, *The Principles of Psychology*, Vol. II, pp. 78–79.

PROBLEMS

1. Select six utensils commonly used and state what problem each was invented to solve.
2. What is essential to a real problem?
3. To what steps in the making of a new means of control does Faraday refer when he says, "The world little knows how many of the thoughts and theories which have passed through the mind of a scientific investigator have been crushed in stillness and secrecy by his own severe criticism and adverse examination; that in the most successful instances not a tenth of the suggestions, the hopes, the wishes, the preliminary conclusions have been realized"?
4. Give three instances in which you have made several hypotheses before locating a difficulty.
5. Give three instances in which you have made several hypotheses before finding the one which solved your problem.
6. Show in six instances that the hypotheses you have made either to define or to solve problems were the result of analogy.
7. Give from your own experience an illustration of the acquiring of some means of control in which the four essential steps clearly appear.
8. Criticize the doctrine of *sense realism* as advocated by Ratke and Comenius.
9. State and criticize Herbart's idea of the nature of the mind.
10. State and criticize Plato's theory of how ideas are acquired.

CHAPTER VI

PERSONAL DEVELOPMENT

Personal development, which is the result of attaining purposes through means of control, takes place under the condition of interest or the condition of effort. Interest is felt when the process of self-realization runs smoothly, without conflict of purposes; effort is felt when there is a conflict of purposes. The condition of interest, when interest is intrinsic, is more favorable to personal development than is the condition of effort, with the exception that general regulative ideals such as duty and strength of will can be acquired only under the condition of effort. On the subjective side, personal development appears as character-building; on the objective side, it appears as world-building. Character-building consists in acquiring purposes together with ability to use means of control in realizing them. World-building consists in making meanings and purposes objective and permanent by associating them so intimately with things of the world that they appear to be inherent in and to constitute the essential nature of these things.

I

In order to understand personal development, we must understand (1) the nature of interest and of effort, (2) the nature of character-building, and (3) the nature of world-building.

The self-active process, which consists of realizing purposes through means of control, is continuous throughout life. No sooner has one purpose been carried out than another desired condition of the self excites in the individual pleasurable anticipation and becomes the object of his attention. This fact has led the poet to say,

> Hope springs eternal in the human breast;
> Man never is, but always to be blest.

Man is not led, however, by a mere will o' the wisp. Every worthy purpose realized brings some degree of blessing. It helps to develop in his experience the values which make life worth living and to give him more effective control in attaining them; in other words, it promotes his personal development. Personal development is sometimes called self-realization, because, as purpose after purpose is attained, possible conditions of the self are made real. We have now come to the third larger problem in the study of the individual process; namely, the problem of how purposes and means of control, which are both the factors and the products of the individual process, together constitute personal development.

Several facts point to what we must study in order to get a better understanding of personal development. Both interest and effort mark conditions that affect it; for interest is felt when the process of realizing purposes runs smoothly, and effort is felt when the process runs with difficulty. As a person develops, his character is built, because the character of an individual depends upon his purposes and his ability to realize them. At the same time, the world as it appears to him is built, because purposes and meanings become so intimately associated with things of the world that they appear as inherent values and meanings of these things. The same development, therefore, looked at from the side of inner personality, the subjective side, appears as the building of character; and looked at from the side of things of which the individual is conscious, the objective side, appears as the building of a world. In order to get a better understand-

ing of personal development, we must study, therefore, (1) the nature of interest and of effort, (2) the nature of character-building, and (3) the nature of world-building.

II

Interest originates in purposes and is carried over to the means of control which serve these purposes; in other words, interest in a purpose is immediate and interest in a means of control is mediate.

The source of interest is purpose. An individual cannot have a purpose unless he is directly, immediately interested in it. Interest may be carried over, however, from the purpose to the means of control which serves it. Interest in the means of control is mediate, indirect, just because it originates elsewhere and is carried over to the means. The individual would be indifferent to the means were it not connected with the purpose. Professor Dewey says: "Genuine interest in education is the accompaniment of the identification, through action, of the self with some object or idea, because of the necessity of that object or idea for the maintenance of self-expression." [1] The "object or idea" may be either a purpose or a means of control through which this purpose is being realized. In the former case, the accompanying interest is called *immediate;* in the latter, it is called *mediate.*

An illustration will make plainer the difference between immediate and mediate interest. A boy who desires to catch fish is interested immediately in the object of his desire, and may find it difficult to think of anything else, so strong is his interest. He identifies himself with the idea of catching fish by making it his purpose. His activity is directed towards realizing this future condition of the self. When he digs in the garden for bait,

[1] Dewey, John, *Interest as Related to Will*, p. 12.

however, he is interested in digging not directly, but because it is a means for carrying out his purpose of fishing. The interest here is mediate, because digging is interesting not in itself, but because it serves the purpose of fishing, which is the source of the interest.

An incident that happened when the author was teaching in a high school may be used for further illustration. A boy who had found mathematics very uninteresting and who, with patient resignation, had surrendered to mathematical difficulties, suddenly had a great, though temporary, change of heart towards this subject. He even remained after school and asked the teacher to explain to him how to find the value of π to more than five decimal places. He said that he desired to get a more accurate figure than 3.14159, which was given in the textbook. As the teacher explained the process for finding the value of π, the boy manifested much interest, and himself verified later each step in the calculation. Curious as to what had brought about this change of heart, the teacher, upon inquiry, found that the boy wished to use the value of π in a contest for a bicycle. In a shop window was a bicycle with a cyclometer attached to the rear wheel, which was turned by an electric motor. The face of the cyclometer was concealed. The motor ran at a uniform rate for eight hours a day. A sign in the window said that the bicycle would be given to the person who would make the most nearly correct estimate of the number of miles that would be indicated by the cyclometer at the end of eight days. The boy's purpose was to possess the bicycle. As he thought of this, he was thrilled with an immediate, spontaneous interest. But in order to carry out his purpose, it was necessary to make the most nearly correct estimate of the number of miles

to be indicated by the cyclometer. In order to do this, he must know the circumference of the wheel and the number of revolutions made in a unit of time. The number of revolutions in a unit of time he found by counting the number of revolutions for many minutes and by then finding the average for one minute. Since he knew that the wheel was twenty-eight inches in diameter, he could find the circumference by using the value of π. Other boys were using 3.1416 and 3.14159 as the value of π. A more accurate value than this would be a material help in realizing his purpose. His interest in possessing the bicycle thus became mediated to various means, including the process of finding the value of π. One day, it may be added to make the story complete, he came into the schoolroom with a broad smile and exclaimed, "Teacher, I got the wheel!" He had passed through the means of control to the realization of his purpose, and every step had held him with an interest which had its source in the end desired.

III

Mediate interests are of two kinds, intrinsic and extrinsic. Intrinsic interests are those which originate in purposes that give to the means its normal, distinctive meaning; extrinsic interests are those which originate in purposes that do not give to the means its normal, distinctive meaning. If a person acquires a meaning for a thing or an ideal under the condition of extrinsic interest only, he will not by virtue of this experience make proper use of the thing when occasion calls for it. Ideals acquired with extrinsic interest are narrowly limited in influence.

Interests in means, or mediate interests, are of two kinds, *intrinsic* and *extrinsic*. Intrinsic interests are those which originate in purposes that give to the means its normal, distinctive meaning; extrinsic interests are

those which originate in purposes that do not give to the means its normal, distinctive meaning. A girl who practices on the piano for the purpose of producing better music through improving her technique, has an intrinsic interest in the practice; a girl who practices on the piano for the sake of getting a vacation trip, which has been promised her as a reward for practicing, has an extrinsic interest in the work. The distinctive meaning of piano practice is improvement in technique for the purpose of producing more satisfactory music, not for the purpose of securing a vacation trip. A pupil who studies rules of grammar in order to improve his understanding and expression of the language by a better control of language forms has an intrinsic interest in the rules; if he studies them only for the sake of securing a high grade, he has an extrinsic interest. Rules of grammar get their normal, distinctive meaning from their use in the control of language forms, not from their use in securing high grades. A pupil who behaves well in school for the purpose of paying close attention to his work and of not interfering with the work of others has an intrinsic interest in his behavior, because the interest which attaches to it originates in the purpose that gives good behavior under these conditions its normal, distinctive significance. If he behaves well in school for the purpose of avoiding arbitrary punishment by the teacher, he has an extrinsic interest in his good acts. Good conduct derives its normal meaning, not from the fact that it is a means for avoiding punishment, but from the fact that it is a means for securing other values.

Extrinsic interest, however, may lead to a problem that is defined by a purpose which marks the proper use of the thing, and may thus give, in a degree at least, a

normal meaning. If this were not the case, our schools would be very inefficient indeed, because so much of the interest in schools is extrinsic. A boy who knows that his standing in school will be lowered if he does not get proper verb forms in his compositions, will define his problem as that of getting correct verb forms. In solving this problem, he may acquire the rule that a verb should agree with its subject in person and number, and may thus, in a degree at least, understand the meaning of the rule. But is the use, and therefore the meaning which he gets for the rule, completely normal? If asked why he learns the rule, he will reply, "For the sake of getting correct verb forms," and if asked why he desires to get correct verb forms, he will answer, "For the purpose of getting high grades." He does not connect the rule with its more remote normal purposes, such as correct and pleasing expression of thought and a better understanding of written and spoken language, which give the essential normal meaning to the correct use of verbs.

Since under the condition of extrinsic interest a person uses a thing in an abnormal way and thereby acquires an abnormal meaning for it, he does not by virtue of this experience make proper use of the thing later when occasion calls for it. How many pupils who have learned in school to be quiet merely for the sake of avoiding punishment and not for the sake of better study, are not quiet in a public library or lecture room? When punishment does not threaten them, they do not see the use for being quiet. The pupil who reads aloud only because the teacher calls upon him to do so, does not understand the true meaning of reading aloud and does not, therefore, as a result of this training, see the advantage of reading aloud in the family circle. If he had read aloud in school for

the purpose of informing or entertaining others gathered about him, he would as a result recognize the use of reading aloud in the family circle. Pupils who for the sake of securing good grades have learned to do neat work in writing exercises required in the English class, may do slovenly work in recording notes for their own use in the history or physics class, because they have acquired an abnormal meaning for neat writing and do not recognize it as a means to accuracy and clearness in expression.

When a means of control acquired under the condition of extrinsic interest has been transformed into an ideal by receiving value from the abnormal end it has served, this ideal is narrowly limited in its influence. The fact that an ideal may have a wide influence by being carried from one field of activity to another, as when the ideal of neatness acquired in one kind of work leads a person to be neat in another kind of work, is clearly presented in Professor Bagley's discussion of formal discipline.[1] An ideal acquired under the condition of extrinsic interest does not, however, have this wide influence, because the situation which suggests it is peculiar to one kind of activity. Pupils who in a mathematics class have acquired an appreciation of accuracy by using it merely for the sake of satisfying an exacting teacher, are not likely by virtue of this experience to be influenced by this ideal in other fields of work, because the teacher is the factor in the situation which suggests the ideal. When this particular teacher is not present, they do not become conscious of the ideal. If they had acquired an appreciation of accuracy because they had used it as a means for eliminating error and securing more valuable results, many situations would include factors suggesting to them

[1] Bagley, W. C., *The Educative Process*, pp. 210–217.

the ideal of accuracy. This truth is a matter of common knowledge in prison reform, in which it is recognized that proper ideals of behavior, if they are to function when the prisoner gains his freedom, must not be those peculiar to the prison, but must be developed through intimate association with purposes which give to these ideals their normal value in the life beyond the prison walls.

IV

The feeling of effort appears when two or more purposes tend to lead the individual to act in conflicting ways. It means, therefore, divided attention. Only under the condition of effort can the individual acquire such general regulative ideals as those of duty and strength of will.

The feeling of effort appears when two or more purposes tend to lead an individual to act in conflicting ways. Since from the teleological point of view the only causes of activity are final causes, *i.e.* purposes, these purposes must be responsible for the friction manifested in effort. Not outward difficulty arising from the attainment of a single end, but the struggle of one purpose against another, is the direct cause of the feeling of effort. Since each purpose is a source of interest, *effort is due to a conflict of interests.* Effort means, therefore, divided attention. It indicates that the process of self-activity is not running smoothly. When the pupils in a class are engaged in a spelling match, interest may be dominant, because the purposes which give interest to the work are in the same line of activity; but if the music of a circus parade near the schoolhouse is heard, the spelling match is continued with effort dominant. The activity of listening to the music and of seeing the parade, and the activity of carrying on the spelling match conflict; both

processes cannot be realized at the same time. Attention becomes divided between the two. If the spelling match is abandoned and if the pupils go to the street to see the parade and listen to the music, effort gives way to interest. If the parade passes by and is out of mind, the spelling match may proceed with interest. Again, a person experiences effort in studying when others are talking near him, because the desire to listen to the sounds of their voices and the desire to study tend to lead him to conflicting activities. He cannot do both at once; each interferes with the other.

The degree of effort felt is not dependent upon the amount of energy necessary to carry out the action. A girl may skip rope very energetically and feel no effort in doing so, whereas a much less amount of energy put into washing dishes while she can hear the shouts of other children at play, may bring a strong feeling of effort. A boy may with intense interest lie awake at night planning how to build a hut and to make a boat for camp life; but only with great effort can he, under otherwise favorable conditions for study, plan the solution of an original problem in geometry just before an exciting ball game in which he is strongly interested.

It may appear sometimes that the amount of energy expended in a single line of activity and the degree of effort felt are correlative. But here also effort is due to a conflict of purposes. When the individual has expended much energy, the purpose of checking his activity and resting comes to consciousness because he feels fatigue, which can be overcome by resting. He cannot, however, both act and cease to act at the same time; his purposes conflict. If a girl desires to continue skipping rope in order to skip a larger number of times than a companion,

and simultaneously desires to stop in order to relieve her feeling of fatigue, she experiences effort in keeping up the activity. If at any moment the desire to stop or the desire to continue skipping rope takes complete possession of her, the feeling of effort will give way to the feeling of interest. In mental activity, the same holds true. When an individual feels fatigue or discouragement in any kind of study, the desire to stop appears. So long as this incipient purpose is present, the work is continued with effort; but, if either the desire to stop or the purpose of continuing the study gets the right of way to the exclusion of the other, effort gives way to a feeling of interest. The blocking of the will by difficulty, however great it may be, does not engender the feeling of effort, unless out of this blocking arises a conflict of purposes.

Since purposes are of different values, the conflict in the case of effort is between two desires, one of which, although strong, is felt to be less worthy than the other. Frequently the conflict is between immediate and remote ends, as, for example, in the case of a student in the library who has a tendency to listen to conversation intruding upon his purpose of preparing for class discussion, or as in the case of a drunkard who experiences the conflict between the desire to drink an intoxicant at once and the more worthy desire to get greater values in the more remote future by abstaining from drinking.

When the realization of one purpose is checked by competition with another, other purposes may appear along the line of activity and add their authority to that of the ideal which is struggling to command conduct. When the pupil is tempted away from the spelling match by the circus music, the purposes of securing the approval of the teacher, victory in competition, higher grades,

freedom from punishment, etc., may appear. In addition to more specific purposes along the line of activity, general ideals may be acquired to help out in just such situations as this. These general purposes are, as it were, "free lances" which come to the assistance of worthy purposes that are in danger of being overcome in competition with less worthy ones. Chief of these general ideals is that of duty. Other "free lances" are indicated by such terms as firmness of character, pluck, strength of will, grit. Because such purposes come to the support of others which, without their help, would be abandoned for activities more immediately pleasing, they are sometimes looked upon as disagreeable taskmasters.

The individual can acquire such general purposes as that of duty only through the experience of effort. Since they are acquired ideals, they must be originally means of control and receive values from the ends which they serve. These ends may be freedom from social condemnation and the securing of social approval, or they may be also the intrinsic consequences which led society to give its approval to such ideals. But these ends must be acquired under the condition of effort. Unless the idea of duty is used to overcome a conflict of purposes, the individual does not even know what duty means. Because these general purposes can be developed only under the condition of effort, James says:

Keep the faculty of effort alive in you by a little gratuitous exercise every day. That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason than that you would rather not do it, so that when the hour of dire need draws nigh, it may find you not unnerved and untrained to stand the test. Asceticism of this sort is like the insurance which a man pays on his house and goods. The tax does him no good at the time, and possibly may never bring him a return. But if the fire *does*

come, his having paid it will be his salvation from ruin. So with the man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things. He will stand like a tower when everything rocks around him, and when his softer fellow-mortals are winnowed like chaff in the blast.[1]

It would seem, however, that abundant opportunities for effort appear in the normal activities of everyday life, so that it is unnecessary for a person to go out of his way to find "gratuitous exercise."

Effort, if persisted in long enough, will disappear, leaving the condition of interest. When purposes farther along the line of activity and general ideals, such as that of duty, are called to mind in support of some purpose in its struggle against a less worthy one, they give to this purpose which they support richer value, because this purpose, regarded now as a means of attaining the more remote ends of the act and of realizing such general ideals as that of duty, receives additional value from its intimate association with these ends. As a result, the worthy purpose having been made still more worthful gains so complete a command of action that the desire coming into conflict with it cannot intrude upon it again. The process of self-activity will then run smoothly and interest will be felt.

V

While interest and effort are of no value in themselves, the condition of interest is more favorable to personal development, with the exception that such regulative ideals as duty and strength of will can be acquired only under the condition of effort.

Neither interest nor effort is of any value in itself; they merely indicate whether the self-active process is

[1] James, William, *The Principles of Psychology*, Vol. I, p. 126.

running smoothly or with difficulty. Whether smooth running or conflict is desirable depends upon the character of the realization at the time. A person may be interested in things that are bad as well as in things that are good. The matter of prime importance is the attaining of personal development through the realization of the most worthful purposes. Smooth running when the purposes are unworthy, or when the individual avoids effort by abandoning half-finished tasks because allurements to other activities appear, is undesirable. If interest marks concentration for valuable achievement, it is desirable. If effort means unnecessary checking of activity in the service of worthy purposes, if it means tasks that are mere tasks, it is bad. Interest and effort mark conditions similar to those of peace and war. Peace in a nation may be good under some circumstances and bad under others; war may be just as well as unjust.?

The condition of effort is necessary for the development of certain general ideals such as duty and strength of will, but the condition of interest is necessary for the best development through the realization of other ideals. When the individual feels effort in the study of history and geography, he may be developing general ethical ideals which will steady him in his path of self-realization and thereby add fiber to his moral nature, but he is not making the progress in history and geography that he would make if he felt interest in the work. As Goethe says, "Talent is developed in quietude; character in the turmoil of the world." A talent is developed better in quietude, because in such conditions its development is less liable to be hindered by the appearance of distracting desires. On the other hand, the multifarious interests of the world involve many distracting desires that may

be overcome, and thus furnish the conditions necessary for the development of regulative ideals, which are essential to strength of character.

When effort is largely predominant in the life of an individual, he misses the joy of living which marks the pathway of interest. Pleasurable satisfaction comes from the attainment of ideals; but he is concerned, in a large measure, with overcoming conflict between ideals. As a consequence, the effort-burdened individual is liable to become "dull, stubborn, unalert." This truth is recognized in the saying, "All work and no play makes Jack a dull boy."

VI

Character-building, which is personal development viewed from the subjective side, consists in acquiring purposes together with the ability to use means of control in realizing them.

In the process of personal development, character is built. Character, as has been said, is personal development viewed from the side of inner personality, the subjective side. It marks the potentialities of the individual for social action; or, in other words, what he can be expected to do. What he can be expected to do depends upon his purposes and means of control. The essentials of good character are, therefore, both good purposes and a command of the means of realizing them. Evil purposes make the criminal, who is often very capable in control, but may use this ability to deprive men unjustly of their property and even of their lives. Inefficient control coupled with good purposes makes the inefficient man of good intentions, who also is a detriment to social welfare. The well-meaning but inefficient doctor may cause unnecessary suffering and even death. The well-

meaning but inefficient lawyer may not secure justice for his client. The well-meaning but inefficient philanthropist may increase the very evils he seeks to destroy.

Day by day, the individual builds his character as he acquires new purposes and new means of control through the self-active process. They stand ready with full authority to command and guide his activity, whenever their services are needed. The fact that the values of purposes, when once acquired, are appreciated immediately[1] marks the truth of Aristotle's statement that the good is what appears to be such to the good man. Through the use of means in the service of worthy ends and the transfer of values to these means so as to make them ideals, the web of values has been woven in the experience of the good man so that he appreciates the good immediately.

The fact that acquired meanings, after they have been worked out consciously in solving problems arising from difficulties in action, are recognized immediately[2] marks the truth of James's words,[3] when he says: "As we become permanent drunkards by so many separate drinks, so we become saints in the moral, and authorities and experts in the practical and scientific spheres, by so many separate acts and hours of work. Let no youth have any anxiety about the upshot of his education, whatever the line of it may be. If he keep faithfully busy each hour of the working-day, he may safely leave the final result to itself. He can with perfect certainty count on waking up some fine morning, to find himself one of the competent ones of his generation, in whatever pursuit he may have singled out. Silently, between all the details of his business, the *power of judging* in all that class of matter

[1] See pp. 70–72. [2] See p. 120. [3] James, *opus cit.*, p. 127.

will have built itself up within him as a possession that will never pass away."

Both purposes and means of control must be used normally in building and maintaining an efficient character. The sentimentalist *uses his purposes merely as means* to pleasurable feeling and abandons them as soon as this pleasure has been enjoyed. He may feel satisfaction in weeping over human suffering in the theater, but does nothing to relieve suffering to which the play calls his attention in the life about him. He may enjoy the excitement of some stirring novel of sacrifice for the sake of an ideal, but does not lift a finger to realize in his own life values for which the novel has aroused his emotions. He may feel enthusiastic in listening to an eloquent appeal for extension of the benefits of his religion to the heathen, but does not even put an offering on the contribution plate. As a result, he weakens his purposes; he strips them of authority to command his action; he becomes blasé. Pleasure-seeking through the abnormal use of purposes, if persisted in, defeats itself. Verily, purposes are kept alive only through activity directed to the realization of them as ends. On the other hand, the mere theorist *uses means of control abnormally by treating them as ends in themselves.* His desire is only to get a knowledge of them, not to use them in the service of those purposes upon which their meanings depend and in the realizing of which their truth is tested. As a result, he weakens his control; he gets perverted meanings; he becomes unpractical. Mere knowledge-seeking tends to defeat itself. Popular judgment made no mistake when, in an age in which mere knowledge was sought as the aim of education, it attached to the word "professor" the stigma of unpracticality.

VII

World-building, which is personal development viewed from the objective side, consists in making objective and permanent the meanings and purposes acquired in personal development, by associating these meanings and purposes so intimately with things of the world that they appear to be inherent in these things and to constitute the essential nature of them.

In the process of personal development, the individual builds the world in which he consciously lives, the world as he knows and appreciates it. As Davidson says: "That the human being will, under any circumstances, build up some kind of a world is clear. To a large extent he does so unconsciously, and without any effort. But there are worlds and worlds. The world of the street waif who picks pockets and goes to the reformatory or jail is very different from the world of the great scientist, philosopher, artist, or statesman." [1]

Things hold for us the meanings which, in our personal development, we acquire and associate with them. In the study of how means of control are made, we found that uses, or meanings, become so intimately associated with the things involved that these uses, or meanings, appear as inherent in the things. When an individual looks at a thing, he seems to see directly the meaning of it. A book appears as something to be read, a watch as something with which to tell the time, a rule of grammar as something to make, in a particular manner, the expression of language more exact and intelligible. In this way, as the individual finds new uses for things, he builds their meanings, which constitute their essential nature. This fact points to the truth in Davidson's statement that

[1] Davidson, Thomas, *Education as World-Building*, *Educational Review*, Vol. XX, p. 329.

"every world is a means of satisfying desire and derives all the significance it possesses from such desire." [1]

Things not only hold meanings; they hold also the purposes which, in our personal development, we acquire and associate with them. As means of control take on ideal values from the ends they serve, the meanings of the things involved gain an immediate value which transforms these meanings into purposes. Thus, when a cup of chocolate is placed before a person at a social gathering, he may not merely recognize its meaning as something to be drunk, but may have at once the purpose of drinking it. When an individual sees a book, he may not only recognize it as something to be read; but the sight of the book, if more authoritative desires do not prevent, may carry with it the purpose of reading. As soon as he sees the book, he may say "I desire to read it."

Things make up the world, and because things are the bearers of meanings and purposes acquired in personal development, the world which a person knows and appreciates is the objective record of his own development. He sees meanings and values in his world because he has first put them there. "All things are common to him who sees with common eyes." If he has put only common meanings and values into things, he can see in them only that which is common. Many soldiers in Napoleon's army may have seen in the pyramids of Egypt only huge piles of stone, but Napoleon is said to have exclaimed, "Soldiers, from yonder pyramids forty centuries look down upon you!" He saw this because he had built in his world the meanings and values of the wonderful civilization that once crowned the valley of the Nile, meanings and values of which the pyramids are enduring

[1] Davidson, Thomas, *opus cit.*, p. 332.

symbols. Alluding to Moses and the burning bush, Mrs. Browning says:

> Earth's crammed with heaven,
> And every common bush afire with God;
> But only he who sees takes off his shoes.[1]

How is it possible for a person to see such things? Certainly not by merely opening his eyes and looking. Out of his daily activities in realizing purposes through means of control, he must create the halos which make common objects divinely significant. The fiat of his will when he accepts a meaning as true or a purpose as valuable is verily the fiat of a creator making the heavens and the earth and the things that in them dwell. These things are more than mere objects of sensation; their inner essential natures are their meanings and values, which the individual creates in the process of personal development.

The world which an individual knows includes both matter and mind. Reduced to its lowest terms, matter is a permanent possibility of sensation common to all people. This is because every person, whether child or adult, savage or civilized man, is endowed by nature with the common meaning that matter is something to be looked at, or felt, or sensed in some other way. He must have this meaning in order to be conscious of matter at all. Then, as he develops new uses for material things, he acquires new meanings for them.

The minds of other persons are never known directly, but only through the medium of matter. The price which every person must pay for his individuality is that he can never know directly the mind of any one else. He is immediately conscious of other bodies, but the existence

[1] Browning, Elizabeth Barrett, *Aurora Leigh*, Bk. III.

of other minds is only an assumption, an hypothesis that works in the control of his experience. He must assume the existence of other minds in order to realize his ideals of sympathy and love, and in order to understand and control the activities of others. By accepting this hypothesis and acting upon it, he makes it into a reality in his world. So real does this hypothesis become that he may have to take a second thought in order to convince himself that he does not know other minds directly.

Because new means of control are hypotheses that work, that bear the test of action, and because these hypotheses are derived through analogy from other means of control,[1] the meanings of the world as we know them form a great web of analogies. Confronted by multifarious active things, — flying birds, rippling brooks, rolling stones, moving sun, moon, and stars, — primitive man naturally attempted to explain the activities of these things through analogy with his inner experience of the causes of his own activity. This led to his belief in animism; he attributed to all objects minds, spirits, like his own. He believed that he could control natural objects by propitiating, by "getting on the good side of," these spirits. Regarding certain classes of objects as inanimate, civilized man eliminated thought and feeling from the hypothesis which, under the assumption of animism, had been used to explain the changes in these objects. This left in the hypothesis only blind will, or energy, which was considered the "efficient" cause of changing phenomena. A person cannot directly see force, or cause, in changing phenomena of the material world. Just as truly as he reads into other persons his own thoughts and feelings in order to understand their con-

[1] See p. 110.

duct, he reads into inanimate objects his own inner experience of energy stripped of thought and feeling, in order to explain the changes in these objects. This fact is evident whether he accounts for the phenomena of two freight cars bumping together or of the activities of atoms and molecules. That the meanings of the world as we know them form a great web of analogies appears, therefore, even in the derivation of the scientific concept of material cause from analogy with inner experience.

When matter was greatly enriched through the sciences, each new science, guided by analogy, borrowed its hypotheses, and therefore its truths, from other scientific truths previously established. The matter and motion of physics became thus a basis for hypotheses which explain chemical changes; the truths of chemistry became a basis for hypotheses which explain biological changes; and the truths of biology became a basis for hypotheses which, according to psychology, explain mental changes.

Things become more closely related as their meanings develop, because they become organized with reference to purposes which they are found to serve. The individual thus organizes his world in a large degree without deliberately seeking to do so, but he carries this organization much further because he has an inborn desire to do so. This inborn desire appears as curiosity, pure scientific interest, and philosophic wonder. It is strengthened by acquired values. For the same reason that a mechanic who uses many tools can do more effective work by arranging his tools in an orderly way, so the individual, by organizing his means of control in general, can more effectively realize purposes. This fact gives to the organizing of means of control an added value. Thus through

both native and acquired desire, the individual longs for unity. The strange object, that which has not yet been given a place in the unified world as he knows it, excites his curiosity and troubles him until he has classified it and thereby assigned it a place. Even in the realm of feeling, this desire for order appears. He combines sounds into rhythm and melody, colors into harmony, and his art is satisfactory only when it has unity. In the special sciences, he finds principles which organize meanings by grouping them in classes; in philosophy, he seeks principles which will bring all reality into a unified whole.

With the progress of personal development, the world which the individual knows and appreciates becomes a permanent, objective organization of the meanings and purposes which guide his activity. It is an objective system of plans of action in which the relative values of these plans of action, as he appreciates them, are apparent. As Davidson says, "The evolution of the individual is the evolution of an ordered world in his consciousness." [1]

VIII

From the materialistic point of view, the development of reactions to environment is the physical counterpart of personal development. In its account of the process through which reactions are developed, natural science gives authority to the fact that the condition of intrinsic interest is more favorable to personal development than is the condition of effort, excepting for the acquiring of general regulative ideals such as duty, and it gives authority also to the fact that, in the process of personal development, the character of the individual and the world of which he is conscious, are built.

Let us now view our conclusions in the light of natural science. The physical counterpart of the process of per-

[1] Davidson, Thomas, *opus cit.*, p. 331.

sonal development is, according to natural science, the process of progressive adjustment of the psychophysical organism to the environment, through stimuli and responses. As Münsterberg says, in writing from the natural science point of view, "The development of our reactions is our life history." In explaining the development of reactions, natural science supports the conclusions reached above with regard to the nature of interest and of effort, the nature of character-building, and the nature of world-building.

Interest is the feeling side of attention; when we feel an interest in a thing, we are attending to it. Since interest and attention are thus inseparable, the materialistic explanation of the changes in the nervous system accompanying attention must be also the explanation of the changes in the nervous system accompanying interest. With regard to the physical conditions that parallel attention, Münsterberg says: "Our nervous system is organized in such a way that if we do a certain thing all the opposite actions are inhibited. The channels of motor discharge are somehow blocked for them. If it were not so, attention would not be possible. Now we only have to come back to our previous claim, that those ideas become vivid which find the ways for action open and those ideas are suppressed which find the channels of activity closed. The whole process of attention is then explained." [1] Interest then appears when there is a single channel open for activity. Since this open channel is marked on the side of consciousness by a purpose, the source of interest must appear, from the teleological point of view, to be in a purpose.

Extrinsic interest, as we have learned, marks reactions

[1] Münsterberg, Hugo, *Psychology and the Teacher*, p. 159.

to abnormal situations, whereas intrinsic interest marks reactions to normal situations. Since habit is a connection between specific stimuli and response, an habitual reaction formed in response to the stimuli of one situation is not called forth by the stimuli of a different situation. In the degree, then, that the abnormal situation is different from the normal one, the organism that has acquired its reactions under abnormal conditions will be, to that extent, unresponsive to the situations to which these reactions normally belong. This fact supports the statement that the person who has learned a thing only under the condition of extrinsic rather than intrinsic interest, does not make proper use of the thing when occasion calls for it.

Effort appears when the organism tends to react in conflicting ways. Effort is a condition of divided attention, and since attention is in the line of activity, divided attention must mean divided, or conflicting, activity. In the case of fatigue, the conflict may be merely between a reaction and its inhibition, for "any fatigue sensation works as a stimulus for the opposite reaction." [1] Owing to the fact that "our nervous system grows to the modes in which it has been exercised," [2] the successful reaction following a conflict of responses opens a single way for later nervous discharges under that situation, so that in time the physical conditions of effort tend to give way to the physical conditions of interest.

The condition of interest is more favorable to progressive adjustment of the organism to the environment, because, under this condition, the process of adjustment is not interrupted by a conflict of activities. Since personal

[1] Münsterberg, Hugo, *Psychology and the Teacher*, p. 161.

[2] James, William, *The Principles of Psychology*, Vol. I, p. 112.

development is the teleological counterpart of this adjustment, the condition of interest is better for personal development. There is one exception, however. The responses which assist in overcoming conflicts of activities, and thereby are useful in adjustment, can be developed only under conditions in which such conflicts appear. From the teleological side, this means that such ideals as duty can be developed only under conditions of effort.

In the progressive adjustment of the organism to environment, the physical counterpart of personal development, character is built. A quotation from James's *Principles of Psychology* will serve to show this.

> The physiological study of mental conditions is thus the most powerful ally of hortatory ethics. The hell to be endured hereafter, of which theology tells, is no worse than the hell we make for ourselves in this world by habitually fashioning our characters in the wrong way. Could the young but realize how soon they will become mere walking bundles of habits, they would give more heed to their conduct while in the plastic stage. We are spinning our own fates, good or evil, and never to be undone. Every smallest stroke of virtue or of vice leaves its never so little scar. The drunken Rip Van Winkle, in Jefferson's play, excuses himself for every fresh dereliction by saying, 'I won't count this time!' Well! he may not count it, and a kind Heaven may not count it; but it is being counted none the less. Down among his nerve-cells and fibres, the molecules are counting it, registering and storing it up to be used against him when the next temptation comes. Nothing we ever do is, in strict scientific literalness, wiped out.[1]

Since habits are the physical counterparts, under proper conditions, of both purposes and means of control, the fact that the building of a good character is the acquiring of habits which harmoniously adjust the organism to the

[1] James, William, *The Principles of Psychology*, Vol. I, p. 127.

environment means on the teleological side that the building of a good character is the acquiring of good purposes and the ability to use means of control effectively in realizing them.

The connecting of habitual responses with stimuli in the process of the adjusting of the organism to the environment is the physical parallel of world-building. Since sensation parallels a stimulus and since meaning and purpose are counterparts of the habitual response, the intimate connection of stimulus and response corresponds to the reading of meaning and purpose into sense impression. This constitutes the developing of the meanings and values of things, which are the objects of sensation, and is, therefore, world-building. The organizing of the world is the mental counterpart of organizing habits of response.

The time when fundamental acquired reactions are being formed, natural science calls the period of plasticity, the period when physical changes in the brain and nervous system are most easily made. From the teleological point of view, this appears as the time when the foundation of the individual's character and world are being laid, when those meanings are being developed which become the bases through analogy of other meanings, and when those purposes are being developed which, in turn, give values to other purposes. In time, these meanings and purposes are held fast in experience by threads of connection running through the whole fabric of the individual's character and world. At the beginning, their variation is easy; but, with the growth of experience, every means and every purpose becomes bound in place by its manifold connections with a multiplicity of others.

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PROBLEMS

1. Can you make a person attend to anything in which he is not interested? Explain.

2. Give three instances in which you were actuated by immediate interest and three instances in which you were actuated by mediate interest.

3. Give three instances in which you have acted with extrinsic interest and three instances in which you have acted with intrinsic interest.

4. Give three instances in which you have experienced effort and indicate the conflicting purposes in each.

5. Give three instances in your experience in which the ideal of duty appeared in a conflict of purposes and assisted a worthy purpose to overcome an unworthy one.

6. Must school work be easy in order to be interesting to the pupils? Explain.

7. In personal development what is the nature and importance of the feeling of need?

8. A recent book says with regard to salesmanship: "The argument that really sells goods is the argument that is based specifically upon the needs of the man you are addressing; the argument that answers the objections to your product that exist in his mind; the argument that offers a satisfactory supply for some demand he desires to fill." Do you believe that this statement is true? Why?

9. What is the value of corporal punishment as a method of moral control?

10. Is the library regulation requiring silence justifiable, or should noise be permitted so that students may develop greater powers of concentration in study? Explain.

11. *a.* What is the most prominent argument made to show that effort should predominate in school work? *b.* What answer would you make to this argument?

12. *a.* Criticize the popular idea of what constitutes a good moral character. *b.* Is this popular idea changing?

13. What is culture?

14. How can strong initiative be cultivated?

15. What is the nature of individuality?

16. Show that since material objects are permanent possibilities of sensation, they become permanent objective memoranda of one's purposes and means of control, and thereby guide one's daily activities in the home, the street, the office, the shop, etc.

17. Which one normally experiences a richer world, the boy of sixteen or the man of sixty? Explain.

18. What is the relation between the world and the individual?

19. Are the making of purposes and the making of means of control two distinct processes or two aspects of one process? Explain.

[redacted]

THE SOCIAL PROCESS

CHAPTER VII

ANALYSIS OF THE SOCIAL PROCESS

Society furnishes two classes of patterns, one to guide the process through which the individual acquires new purposes, and the other to guide the process through which he acquires new means of control. These patterns are developed under social direction. The best patterns for purposes are history and the fine arts; the best patterns for means of control are the sciences. The belief that the most important use of history, the fine arts, and the sciences is to give refined pleasure to the individual during his leisure time, is due to a short-sighted view that does not disclose their essential functions.

I

In the determination of *what* purposes and *what* means of control may be acquired by the individual, society furnishes, through the medium of matter, two kinds of patterns, because there are two processes to be guided.

In the study of human development, we come now to the social factor. The individual process has been explained, but this explanation does not tell the whole story of human development. It accounts for *how* the individual acquires purposes and means of control, but it does not account for *what* purposes and means of control he acquires. The latter is determined by society; for, as we have learned, the individual is the agent through whom social purposes and ideas are expressed.[1]

Society guides the process of individual development by furnishing so-called patterns. These patterns are the

[1] See pp. 30–31.

factors of the social process; they guide individuals not only to the stage of development attained by the race, but also to the experience of new purposes and new means of control added year by year to the social stock. The scientific investigator, for example, acquires under social guidance not only a knowledge of what has been accomplished in his field of study together with an appreciative understanding of the unsolved problems, but acquires also under social guidance a scientific method which enables him, on the basis of this knowledge, to make further progress. The problem of this chapter is to differentiate, through analysis of the social process, these social factors, or patterns, which guide human development.

Society cannot give directly to the individual new purposes and means of control; it can make him conscious of them only by guiding the processes through which new purposes and new means of control are acquired.[1] For guiding this process, there must be two kinds of social patterns, that which guides the process through which new purposes are acquired, and that which guides the process through which new means of control are acquired. The former guides the individual (1) to feel the value of some purpose, (2) to associate intimately with it a means of control, and (3) to use this means in realizing the purpose; the latter guides him (1) to experience a purpose in the carrying out of which he meets a difficulty, (2) to define the problem through making and testing an hypothesis, (3) to solve the problem through making and testing an hypothesis, and (4) to use the solution in carrying out the purpose.

Under ordinary conditions, the individual is more in

[1] See Chs. IV and V.

need of guidance through some steps than through others. In acquiring new purposes, he needs guidance especially for the first two steps. If the individual is put into a situation in which he feels strongly a purpose and associates intimately with it a means for its realization, he usually passes on, without further assistance, through the third step, that of acting. Society may give him special assistance in the third step, however, by making the situation in which he is placed such that he is not distracted by conflicting purposes and can, therefore, act more easily. In acquiring new means of control, the individual is more in need of guidance for the second and third steps. Purposes which he has acquired command him to act whenever they appear in consciousness; a demand for action is an essential characteristic of every purpose. If difficulties stand in the way of realizing these purposes, guidance is needed especially in defining and solving the problem. The fourth step, that of using the solution, usually takes care of itself. But here, also, society may assist by making the way for action easy. Because of these facts, the most prominent social guidance in the making of new purposes is that which leads the individual to associate intimately means of control with values, and the most prominent social guidance in the making of new means of control is that which leads the individual to define and solve problems.

Illustrations which have been given in the discussion of how new purposes and new means of control are acquired, reveal in a greater or less degree the guiding influence of the social factor; but, in these cases, attention was directed to the individual side. Several illustrations may profitably be given here with emphasis upon the social side.

Let us take an instance in which a child is guided by social influence to acquire the purpose of using polite table manners. (1) His elders, according to social custom, gather about the table at meal time. In this situation, he becomes conscious of the purpose of eating with them. (2) The admonition of his elders makes him associate polite table manners with his purpose as a means of realizing it; or perhaps the remembrance of having been sent away from the table the day before when he behaved badly, may bring to his mind the same association. (3) His elders give him opportunity to use good manners by placing him at the table, and make proper behavior easy for him by acting in exemplary ways and by putting the cake beyond his reach. If his elders set bad examples and if the temptation to seize the cake is not removed, the child may not be able to act properly. Under ordinary conditions, the third step would follow the other two without anything unusual being done to make good behavior easy.

Social influence may guide a youth employed in an office or factory toward the purpose of being industrious (1) by placing him under conditions which make him strongly conscious of the desire for promotion; (2) by leading him, through the examples of other employees and the admonition of his employers, to associate industry with his desire as a means of realizing it; and (3) by giving him the opportunity to work industriously. If distracting temptations were permitted to make concentration upon his work very difficult, the last step might not be taken, and the influence of the first two would, therefore, be lost.

Passing from social guidance in the acquiring of new purposes to social guidance in the acquiring of new means

of control, we may consider an instance in which an individual is led to understand that putting crude oil on a pool of stagnant water is a means of avoiding malarial fever. (1) If he appreciates the fact that sickness should be prevented, his own or his neighbor's sickness due to malarial fever, or a newspaper report of the prevalence of this disease, may bring with it a desire to prevent such trouble in the future. (2) Through printed or spoken words the hypothesis that the difficulty is due to the presence of mosquitoes is presented to him. He can understand this hypothesis, because of its similarity to facts which he has acquired regarding the spreading of disease germs. The test he accepts as satisfactory in this case may be the agreement of medical experts concerning the truth of the hypothesis. He thus reaches the problem of how to get rid of mosquitoes. (3) In a similar way, the hypothesis that crude oil on a pool of stagnant water prevents it from becoming a breeding place for mosquitoes is presented to him as a solution of the problem. He understands this through its similarity to facts he has learned about the nature of insects. Here again the test he accepts as satisfactory is the support of the hypothesis by scientific experts. (4) He uses this means in attaining his purpose of preventing the recurrence of malarial fever in his neighborhood. If the illustration is modified so that the first step is the purpose of merely knowing how to prevent malarial fever, the fourth step is an act of will by which the individual accepts the solution of the problem as a fact. In either case, the need of social guidance is felt especially for the second and third steps. With this guidance, he can acquire in a very short time a means of control which has been the result of years of labor on the part of scientific experts.

All social guidance of the individual must come through the medium of material objects, because material objects alone are common to the experience of all individuals. Since the purposes and means of control of an individual are intimately associated with material things, these things become the medium for the social control of his experience. Other persons may control his meanings and feelings of value by manipulating these visible handles, as it were, to which these meanings and feelings of value are attached. It is by this manipulation that he is guided to acquire further purposes and means of control as he is made to associate intimately means with ends or to define and solve problems.

Words, which are material things that can be seen and heard, are very useful in guiding the individual processes through which new purposes and means of control are acquired. They are freighted with meanings and feelings of values which have been intimately associated with them and which it is their special function to bear. The close connection of words with the meanings and feelings they symbolize is kept alive by daily use. The rich burden of experience with which words are connected and the ease with which they can be manipulated, make them peculiarly suited to guide the process of individual development. Like other things words, however, hold for the individual only those meanings and values which he has already acquired for them through the self-active process. They do not convey new purposes and new meanings to him directly, but convey these indirectly by guiding him through the steps of the processes by which purposes and meanings are acquired.

II

Society leads the individual to appreciate social practices by placing its stamp of approval upon them. A natural result of this is formalism, which retards social progress. The function of history and the fine arts, which are developed under social direction, is to free the individual from formalism by leading him to appreciate the intrinsic values of things. In doing this, history reveals connections between means and ends as they have actually appeared in the development of civilization, whereas the fine arts are free to present in imagination new connections between things and the values they serve.

The source of all values, as we have learned, is in the desires with which individuals are endowed by nature.[1] All other desires, all other values, are derived from these, as feelings of worth are transferred from ends to means, in accordance with the process through which new purposes are made. When the connections between inborn desires and the means which the individual uses to realize them are so simple and direct as to be clearly evident, the means tend to take on independent worth and thus to become ends in themselves. This fact appears in the simple and direct connection made in primitive times between practice in the use of arms and a desire to fight. In such cases, society needs to guide the individual merely in acquiring means of control; the eventual change of the means into purposes takes care of itself. When with the growth of civilization the activities of daily life have become very complex, the new means of control invented are so far removed from the ultimate ends upon which their values depend that their connections with these ends are no longer directly evident. Instances of this fact may be found in the details of modern governmental regulation and in highly specialized work in factories

[1] See p. 79 and pp. 97–98.

under a complex division of labor. This complexity, which obscures the connections between means and ultimate ends, antedates historical times. Even in the case of primitive peoples, the simple means of securing food, shelter, and protection against enemies, were complicated, because of the superstitious belief that these means must be suited not only to the material world, but also to a realm of spirits responsible for changes in the material world.

When the connections of activities with the original ends which they served were thus lost sight of, these activities were not left without authority. Society approved individuals who did them and condemned individuals who did not do them. In this way, it [illegible] them the means of securing social approval a[illegible]oiding social disapproval, to both of which the individual is by nature sensitive. If this did not lend to the acts sufficient authority to command conduct, doing the acts was made a means of avoiding physical pain or even death.

This intimate connection of arbitrary consequences with certain acts so as to give these acts purposive values, came about naturally. When individuals of the earlier generations had come to feel the values of acts as ends in themselves through associating these acts with the original purposes they served, these individuals naturally approved those of the next generations who did the acts and condemned those who did not do them. The original purpose having been lost sight of, the values of things were passed on in the same arbitrary manner. When later generations met new difficulties in doing these things which they had been led to appreciate as means to social approval, they invented new means of control to overcome these difficulties. In turn, they appreciated the new means as

ends in themselves and passed them on to later generations with no guidance as to the values of these things, save the social approval they gave to individuals who did them. In this way, the stock of things which depended for their authority merely upon social approval accumulated from generation to generation.

Let us consider briefly an instance of this substitution of social approval for the intrinsic values which gave rise to various forms of Latin study. In the early part of the Italian Renaissance, Latin classics were used as a means for guiding people to a fuller realization of human welfare. For this reason, the study of these classics received social approval sufficient to cause its retention in schools after the original purpose had been forgotten. After difficulties in understanding the Latin classics had been overcome by a systematic study of the language itself, this study, without reference to other values, as the fact that it became purely formal shows, was continued in schools because it was socially approved as a thing worth while in itself.

Even down to the present time, society has made much use of this way of guiding individuals to feel the values of things by connecting these things closely with social approval or disapproval. For many of the things that we do every day, we have learned no other justification. This method of transmitting appreciations of value was especially strong in the case of primitive peoples, who did not, for the most part, attempt to explain the values of things by connecting them with intrinsic ends which they served, but rather taught them authoritatively as things to be done. In the initiatory rites of savage peoples, impressive ceremonies, in many cases preceded by fasting and by prolonged silence on the part of the

initiates, made the transmission more authoritative. This arbitrary social guidance, in which the true purposes of the social practices were lost sight of, led to all the evils of formalism, and thus checked the advance of civilization, because practices which had outgrown their true usefulness were still continued under social guidance merely as means to social approval. Change was put under the ban, and people became "tradition bound."

The development of the subject matter of history served to relieve this situation. History shows why things are done by revealing the connections of these things as means not merely with social approval, but also with the remote consequences which alone are responsible for their true values.

In dealing with the various forms of Latin study referred to above, history, looking beyond mere social approval, would show that the study of the classics had been used to serve the purpose of securing human welfare, and that, in turn, a systematic study of the Latin language had been used to serve the purpose of understanding as fully as possible the content of the classics.

History turns our attention to the past, when social life was simpler, and traces from generation to generation the new means invented to overcome new difficulties, connecting them with the intrinsic purposes which these acts served as means, down to the intricate connections between means and ends in the present highly complex civilization. It reveals in this way why society was led to approve various acts. Thus does history give a discriminating sense of the real worth of practices in our present social life, so far as men understood that worth when they established the practices. Thus does it free social activities from the conservative bonds that tradi-

tion is ever fixing upon them; for many of the things which tradition sanctions may be discarded as useless or may be improved, when the intrinsic purposes which they serve are known. In a word, history helps to save men from blind tradition, which approves equally the useful and the useless, the good and the bad, if only they once become established as social usages.

But even before the day of history, the development of literature and of the other fine arts served to relieve the situation in which society arbitrarily guided the individual to appreciate things merely as means to social approval. The fine arts isolate things from the bewildering complex of social action, and, by connecting these things with values which the individual strongly feels, lead him to appreciate them. The *Twenty-Third Psalm*, for example, isolates the act of following the Lord and connects it with various desirable results for the attaining of which this act is represented to be the means. In performing their function, the fine arts are not limited, as is history, to recounting what has actually happened in the development of civilization, but are free to create imaginary situations in which means receive value from the ends they are represented to serve. In this way, the fine arts develop ideals. The details of how this is done will be given in the next chapter. It is sufficient here merely to state that the fine arts free the individual from the formalism of tradition by developing his appreciations of worth.

The making of history and the fine arts is done under social guidance. In the case of history, this fact is clearly evident, because the historian is dependent upon records of the past for the connections he makes between purposes and means of control. He traces and records these con-

nections as society experienced them when new means were invented from generation to generation in the development of institutional practices. Furthermore, in finding and interpreting historical facts, he is guided by a technique created through many generations of historical investigation and by the conclusions which have been reached in previous historical investigations and socially transmitted to him by means of books and lectures. That the fine arts are made under social guidance is not so evident, but, nevertheless, is equally true. Works of art, which are patterns for new ideals, are attributed to individuals such as Homer, Raphael, Michelangelo, Shakespeare, Browning, and Tennyson, who were agents through whom social values were expressed; but the character of the new ideals to which these works of art lead depends upon the artist's place in a developing social order. The fact that his poem or picture can guide other individuals to the same appreciations that he feels is evidence that he must connect means which others already understand with ends which they appreciate. He may, however, represent these means and values in new combinations, but even here he is under social guidance, because these new combinations are based upon the thoughts and feelings he has acquired socially.

III

So long as means of control were developed by a crude trial and success method and unsystematically transmitted through imitation as concrete facts, social progress was seriously limited. The function of the sciences, which are developed under social direction, is to remove this limitation by organizing means of control, by transmitting them in the form of principles rather than as a multiplicity of particulars, and by leading to the invention of new means of control through a method of procedure devised especially for that purpose.

In primitive times, the development of control depended entirely upon a crude trial and success method. A new means of control was often the result of mere accidental variations from the customary ways of doing things. As Professor Monroe says with regard to the development of the means for making pottery: "Discovering first, through the accidental burning of a willow basket from around the clay bowl within which liquids were kept, that the clay would harden and become liquid proof, the primitive man for generations continued to make pottery by first making the willow basket, plastering it over with clay, and then burning out the wooden model. By accident again discovering that the clay could be shaped direct, he continued for generations to impress the stamp of the unwoven willow upon the clay, that it might be burned in, though he made no willow model or form." [1] The new variation would not, however, be transmitted under social guidance were it not understood in the light of previous experience to be a means of overcoming a difficulty in attaining some purpose.

A means of control which is developed by the crude trial and success method has the disadvantage of being closely limited, because it is associated with all the characteristics of a particular complex thing rather than with certain characteristics essential to control. It is transmitted socially as a concrete fact without reference to the causal principle involved. How this limits control may be shown by an illustration. When recently a young woman's clothing, through an accident with wood alcohol, was suddenly enveloped in flames, some one extinguished the flames by wrapping her in a rug. An uneducated colored woman, who was the first to see the accident and

[1] Monroe, Paul, *A Text-Book in the History of Education*, p. 11.

who had stood fixed with excitement at the alarming situation, found voice to say, "Well! I done knowed you could put out a fire with a blanket, but I never knowed you could do it with a rug!" The control which the colored woman had acquired under crude social guidance was limited thus to a particular means.

The sciences free man from this limitation. If the colored woman had learned that fire is due to the uniting of certain gases with the oxygen of the air, and that consequently anything which will shut off the air will extinguish the fire, she would have had a means of control adapted to the essentials of the situation and would not have been handicapped by the non-essential characteristics of the material used to exclude the air.

The sciences organize means of control, transmit them in the form of principles rather than as many isolated particulars, and make advancement more rapid by substituting for the hit-and-miss method a definite form of procedure in the inventing of new means of control. Through the use of this rationally controlled method, advancement is made all the more rapidly, because this advancement goes from widely controlling principle to principle rather than from narrowly controlling particular to particular. This fact may be seen within the limits of any one field of science, where new principles are developed through analogy with those already established; it may be seen also in the relation of one science to another, where the principles of one have given, through analogy, the hypotheses which were used in making the principles of another. In this way, as we have learned, psychology is connected with biology, biology with chemistry, and chemistry with physics.[1] In a word, science is a means of

[1] See p. 150.

control devised to make more effectual the invention, transmission, and use of means of control.

The making of new patterns for control, whether by the hit-and-miss method of primitive man or by the carefully regulated investigations of the modern scientist, is done under social guidance. Since the individual is the medium through which society works, new patterns for control must be made by the individual process. For this reason, in cases where records have been made of their invention, these new patterns for control are associated with particular individuals in whose experience they first appeared. The geometric proposition that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides, is attributed to Pythagoras; the heliocentric conception of the planetary system, to Copernicus; the idea of the circulation of the blood, to Harvey; the law of gravitation, to Newton; certain theories of knowledge, to Locke, Leibniz, and Kant; certain religious doctrines, to St. Augustine; the steamboat, to Fulton; the cotton gin, to Whitney; the sewing machine, to Howe; the theory of evolution, to Darwin; certain educational methods, to Comenius, Herbart, and Froebel; the electric light, to Edison; heavier-than-air flying machines, to the Wright brothers; and so on. How society guides the individual process in making new inventions such as these may be shown by illustration.

In the first place, society gives to the individual the purposes in the pursuit of which his problem arises. The primitive man who first found fire to be a means for making pottery would have paid no attention to the hardening of clay in the fortunate burning of the clay-lined willow basket, if he had not lived in a tribe which

had trained him to appreciate the value of containers. Whitney would not have thought of the desirability of seeding cotton, if he had not lived in a society that, as the result of many generations of development, had found the value of seeded cotton for textiles and other things. If Froebel had not been introduced at Frankfort and elsewhere to the school, an institution which is the product of centuries of social development, he would not have had the purpose of improving educational methods. If Darwin had not lived at a time when a social need was felt for some widely organizing principle in the field of biological science, he would not have had the purpose of finding a way to explain the origin of species.

After the individual has formed his purpose under social direction and has experienced a difficulty in realizing it, society gives further direction by furnishing the knowledge upon which he makes, through analogy, the hypotheses that define and solve the problem. The primitive man who first found fire to be a means for making pottery recognized difficulties in the use of willow baskets lined with unbaked clay and recognized also the effect of fire in hardening the clay so as to overcome these difficulties, because in his life with others he had come to recognize the difficulty and its solution. It was because Whitney, under social guidance, had acquired a knowledge of mechanics and other things, that he was able to construct the mechanism for the cotton gin. These scientific ideas upon the bases of which he defined and solved his problem were the result of many generations of social development. Even if the analogy which gives the solution is found through the suggestion of some fortunate accident, as is said to have been the case in the invention of the cotton gin, the suggestion is none the less socially determined;

for it would never have been recognized in its relation to the problem, unless the individual had been prepared for this through social guidance. If Froebel had not gained, under social guidance, ideas of religious mysticism, Lamarckian ideas of development through use, and a philosophical doctrine of monism which was prominent at his time, as well as many other things, he could not have defined and solved the problem which resulted in his theory of education as the development of the divine nature of the child through self-activity. The knowledge of the principles of breeding and other things, which Darwin had acquired under social guidance, determined the nature of the hypotheses that defined his problem and led him to the principle of natural selection; for it appeared that natural selection would do a work similar to the selection made by breeders in improving animal stock.

When the problem has been defined and the solution made, society adopts the use of the new means of control and thereby adds it to the stock of patterns to be handed down from generation to generation. This is due to the fact that individuals who have been guided through the previous steps naturally pass on to the realization of the purpose which started the process.

Because of the difficulty of making the analogy which leads to the new means of control, new social patterns which mark important steps in advance usually appear first in the experience of only exceptional individuals, the names of some of whom have been given. After a new means of control has once been made, the common man, as has been said, can see the analogy which it bears to the truth he has already received under social guidance, and can thus take the steps necessary to acquire the new meaning.

Sometimes social conditions guide several individuals to invent a new means of control at practically the same time. Striking instances of this appear both in contests for patent rights and in cases where the courts are not called upon to settle the questions of priority. Bell and Gray both claimed credit for the invention of the telephone. James and Lange share credit for a certain theory of the emotions; Darwin and Wallace, for a certain theory of evolution; Dewey, James, and Schiller, for the philosophic doctrine of pragmatism.

In a large degree, social patterns are made coöperatively. Thousands are working under social guidance in particular lines of specialization in religious, industrial, commercial, scientific, political, or other social activities. As soon as one person has defined a new problem, formed a new hypothesis for its solution, or put any hypothesis to the test, whatever actual advance he has made may be transmitted to other persons, so that they may center their energies upon making still further advance. Scientific and other journals devoted to particular kinds of work give good opportunity for such free exchange of experience.

As a new means of control is copied by individual after individual, it is simplified. This is conspicuous in the case of machinery. The first locomotives, threshing machines, automobiles, and typewriters were clumsy compared with those of later times. The clumsy parts are simplified usually through the small inventions of many individuals. The same is true in the case of means of control in sciences, education, politics, and every other field of activity. Sometimes the individual who puts the new idea in a simple and clear verbal form so that others can acquire it easily, is the one who gets credit for

inventing it, because it is socially transmitted in the form he gives to it.

IV

Through history and the fine arts the individual may acquire new means of control, and through the sciences he may acquire new ideals; but, in either case, these results are only incidental and not attained so economically and effectively as under the guidance of subject matter especially designed to give them.

The distinction we have made between the function of history and the fine arts on the one hand and that of the sciences on the other, is relative rather than absolute. Contrary to this distinction, it is true that through history and the fine arts an individual may acquire new means of control, and through the sciences he may acquire new purposes. But these results, in either case, are only incidental; they are by-products, secondary results, which can be attained more economically and effectively under the guidance of other subject matter specially designed for that purpose.[1]

So far as purpose-giving subject matter is concerned, an individual who has learned through history how things were done in the past may find some of these means of control useful in overcoming difficulties in the present; but various sciences, such as political science, economics, sociology, and military science, are more effective and reliable guides for overcoming present difficulties. These sciences are the accumulated product of generations of thought in the service of this very purpose. It is not uncommon, indeed, for these sciences to reveal that means of control used in the past were not the best in the situations in which they were used. It is true that

[1] See pp. 112–113.

the social sciences use some of the material used by history; but they select from the records of the past only certain kinds of facts and work them over according to the method of the science concerned, not according to the method of history. The comparison of a textbook in economics with a textbook in history will make this fact clear. The social sciences undertake to discover the relations of cause and effect among social facts in order to provide scientific knowledge that may be used to solve our social difficulties and thereby to improve our social practices; history, on the other hand, undertakes to discover the purposes responsible for our social practices, whether these practices are useful or not.

That the fine arts are less effective and reliable than sciences in giving control is so patent as not to require discussion. Improvement in control depends upon a thoughtful solution of problems, which is characteristic of the sciences. The fine arts, however, in order to create new appreciations of worth, must emphasize feeling rather than thought; they must call forth strong appreciations of value with which means of control are associated rather than devise with cool deliberation these means of control themselves.

The various sciences are made for the individual who has already acquired through other social influences the desire to use them, and are not fashioned, therefore, to develop such desire. They center attention so exclusively upon control that the appreciations of value aroused by them are too weak to exert much influence in transforming means into ideals. A person does not study the science of medicine in order to make himself desire to become a physician, but, on the contrary, his desire to become a physician leads him to study medicine. The scientific

textbooks he uses are not concerned with putting a halo of value about the medical profession, but with the solutions of detailed problems in bacteriology, physiology, anatomy, pharmacology, etc.

The sciences may develop purposes to some degree, but they are not so effective in doing this as are social approval and purpose-giving subject matter. It is generally recognized that, for instance, grammar, logic, and ethics are comparatively weak in developing desires for correctness in speech, cogency in argument, and goodness in conduct. Each of these sciences is fashioned to give control to individuals who already have the purpose which it serves. But are not sciences such as physics, chemistry, and mathematics excellent guides to such general virtues as industry, accuracy, neatness, impartiality, and truthfulness? In answer, it may be asked whether these sciences ever refer directly or indirectly in any way whatsoever to the virtues mentioned. The individual may learn *outside the limits of the content of these sciences* the truth that he can secure the desired results in scientific study only by having these virtues, and thus may carry over to these virtues the values of the ends desired; but the sciences themselves do not tell him this. They provide merely one of the many classes of activities in which such ideals may be useful.

V

A short-sighted view of the functions of history, the fine arts, and the sciences discloses only the immediate pleasure which they give, and makes it appear that their most important use is to afford refined pleasure to the individual during his leisure hours. Their essential function is no more to give pleasure, however refined and valuable it may be, than the essential function of eating and drinking is to tickle the palate and refresh the throat, rather than

to nourish the body for action. By developing and organizing his purposes and means of control, these classes of subject matter capitalize the individual's hours of leisure against the day of action.

History, the fine arts, and the sciences, under normal conditions, give pleasure to the individual. There is pleasure in dwelling upon the interesting life of ancient Athens and Rome, seeing the creations of Michelangelo and Raphael, witnessing the plays of Shakespeare, reading the poems of Browning and Tennyson, admiring the wonders revealed by Euclid and Copernicus. Some thinkers have been so short-sighted as not to see beyond this immediate feeling and have assumed that the chief use of history, the fine arts, and the sciences is to give refined pleasure to the individual during his leisure hours. If any result more permanent than this pleasure is recognized by such thinkers, it is vaguely called culture, defined only in terms of feeling, and classed with silk hats and kid gloves, which give an appearance of worth to the man whose head and hands they adorn. This belief is most prevalent with regard to the fine arts. Some practical value is generally admitted for history and still more for the sciences. A wider view reveals the fact that all of these classes of subject matter are primarily guides to results so important as to overshadow completely whatever immediate pleasure or whatever more permanent but equally impractical adornment they may give to the individual. Just as eating and drinking are not merely for tickling the palate and refreshing the throat or even for making the body more beautiful, but serve the far greater purpose of sustaining and developing the body for action, so history, the fine arts, and the sciences serve the purpose of sustaining and developing the character

of the individual. The individual who profits normally by the guidance of these subjects acquires more than mere adornment; he capitalizes his hours of leisure against the day of action. If he has been led to acquire ideals that are worthy and strong, and control that is organized and efficient, he will stand in the hour of trial when others go down before temptation and difficulty. Instead of giving only temporary pleasure in the time of leisure and personal adornment afterwards, these subjects, under normal conditions, make leisure of practical value by turning it into the service of action. At no time can man escape his destiny, which is practical.

The short-sighted view of the value of history is given by Herbert Spencer, who says with regard to the contents of books on this subject:

> They are facts from which no conclusions can be drawn — *unorganizable* facts; and therefore facts which can be of no service in establishing principles of conduct, which is the chief use of facts. Read them, if you like, for amusement; but do not flatter yourself they are instructive. . . . The only history that is of practical value, is what may be called Descriptive Sociology. And the highest office which the historian can discharge, is that of so narrating the lives of nations, as to furnish materials for a Comparative Sociology; and for the subsequent determination of the ultimate laws to which social phenomena conform.[1]

It is true that many writers of books labeled history have not understood clearly the function of this subject and have presented, therefore, so much useless material that the true function of the subject matter is obscured. Spencer's condemnation of many books of his time that purported to be histories, is, in a large measure, justifiable.

[1] Spencer, Herbert, *Education*, 1890, pp. 52, 55.

But he is short-sighted in failing to see, amid the mass of irrelevant matter given in these books, connections of social practice and social purpose which give to the reader a more appreciative insight into the present complex social situation, not by leading him to the best ways of meeting social difficulties, as the sciences would do, but by lifting the curtain of formalism which conceals the purposes of present social activities, irrespective of whether these activities are effectual or not. The history of education, for example, does not reveal what subject matter should be in the curriculum; that is a question for science to answer. It does reveal, however, the purposes which led men to select the subject matter now in the curriculum. With reference to these purposes educators may eliminate that part of the curriculum which has been selected in the interest of purposes no longer valuable, may modify other parts so as to attain more effectively the purposes they serve, and may supply new subject matter for realizing purposes not provided for in the old curriculum.

When Spencer says, "The only history that is of practical value, is what may be called Descriptive Sociology," he does not recognize the practical value of history, but that of something else essentially different from history in both purpose and method, and which cannot be made history by changing its name. Far from being a mere servant, a mere hewer of wood and drawer of water for the sociologist, the historian has an independent mission of his own and aids human development in a practical way that is just as necessary, useful, and honorable as the work of the sociologist.

The short-sighted view of the value of the fine arts also may be stated in the words of Spencer:

And now we come to that remaining division of human life which includes the relaxations, pleasures, and amusements filling leisure hours. After considering what training best fits for self-preservation, for the obtainment of sustenance, for the discharge of parental duties, and for the regulation of social and political conduct; we have now to consider what training best fits for the miscellaneous ends not included in these — for the enjoyments of Nature, of Literature, and of the Fine Arts, in all their forms. Postponing them as we do to things that bear more vitally upon human welfare; and bringing everything, as we have, to the test of actual value; it will perhaps be inferred that we are inclined to slight these less essential things. No greater mistake could be made, however. We yield to none in the value we attach to æsthetic culture and its pleasures. Without painting, sculpture, music, poetry, and the emotions produced by natural beauty of every kind, life would lose half its charm. So far from thinking that the training and gratification of the tastes are unimportant, we believe the time will come when they will occupy a much larger share of human life than now. When the forces of Nature have been fully conquered to man's use — when the means of production have been brought to perfection — when labor has been economized to the highest degree — when education has been so systematized that a preparation for the more essential activities may be made with comparative rapidity — and when, consequently, there is a great increase of spare time; then will the poetry, both of Art and Nature, rightly fill a large space in the minds of all. . . . Architecture, sculpture, painting, music, poetry, etc., may be truly called the efflorescence of civilized life.[1]

It is true that the fine arts do belong, in a large measure, to the leisure time of life. When the individual is permitted to escape the wearisome demands of practical life with its serious responsibilities, they offer to him easy pathways to a delightful land of make-believe, where his imagination can play unrestrained and his spirit can be refreshed. But although he may not be conscious of the fact, play is conducive here, as elsewhere, to the serious business of life; it is not for itself alone. The kitten that

[1] Spencer, Herbert, *Education*, 1890, pp. 57–59.

scampers after a leaf fluttering in the wind, is preparing for the necessity later of capturing its prey; children in their many forms of play gain better control of their bodies, and acquire other abilities useful in the practical life. Likewise, while the individual is enjoying good poetry, sculpture, painting, or music, he is developing and organizing, with no conscious effort on his part, feelings of value, which as purposes take the leadership of his conduct in the world of practical activity and thereby make his life more worthful. While enjoying the play *Hamlet*, he acquires an appreciation of the value of action to realize his ideals when "the time is out of joint;" while enjoying the singing of the national anthem, he enriches his appreciation of national ideals.

When Spencer says that he yields to none in the value he attaches to æsthetic culture and its pleasures, and that without painting, sculpture, music, poetry, and the emotions produced by natural beauty of every kind, life would lose half its charm, he looks no further than the immediate enjoyable feelings that come with them, not to their value as definite guides to more worthful action beyond the library, art gallery, music room, or scene of natural beauty. When he calls the fine arts the efflorescence of civilized life, the champion of the sciences is not mindful that flowers have important functions in the economy of plant life, but intends to convey the impression that they are produced only to be looked at and smelled! This short-sighted view makes it appear that the fine arts will come to their own after all social difficulties have been vanquished. If, however, the influence of the fine arts in giving ideals and thereby in preparing men to work for the advancement of civilization is recognized, Spencer's conclusion here is as illogical as to hold that a

worker should postpone preparing for the duties of his calling until he has the leisure that goes with a retiring allowance.

When the fine arts arouse feeling, they must, according to the laws of human development, nourish the ideal nature of acts associated with these feelings. This fact has been explained in the discussion of how new purposes are made.[1] This transfer of value is inevitable, for every thrill of appreciation is an incipient purpose which commands activity for the realization of the value revealed by it; and though acts but touch the hem of the garment of this feeling, virtue gets into them and makes them appear worthful in themselves. There must always be two kinds of values derived normally from the fine arts; the immediate pleasure which comes with appreciation, and the enrichment of ideals through the transfer of feeling. One is a fleeting thrill; the other is a permanent acquisition in the building of character. There can be no question as to which marks the essential function of the fine arts.

Only when the ideal-giving subject matter is connected with the hours of work as well as with the hours of leisure, can it give even the refined enjoyment which has loomed so large before the short-sighted. Because men have hungered and loved and fought and lost and triumphed and worshiped, they can appreciate the best in poetry, painting, and music. Symbolic reference to these things by the fine arts arouses strong emotion just because they do point to practical realities which men feel in the pulsations of their own blood. And not only must appreciation be fed constantly in this way by values which originate in the practical life, but, if the individual does not

[1] See pp. 72–74.

act to realize the purposes to which the fine arts direct his attention, his capacity for getting pleasure from the fine arts is decreased. The first stage of this is marked by vapid sentimentality and the next by the unresponsiveness of the blasé. In a word, the thrills which are aroused by the fine arts have inherited their worth from the practical life out of which they have been born, and it is their duty to pass on this inheritance to a progeny of new and better leaders for life's struggle. If they fail to do this, their birthright has been sold for a mess of pottage.

That the practical value of the fine arts overshadows the value of the momentary pleasure which they give, is evident when the two come into conflict. In the case of food, the sense of taste gives pleasure and at the same time guidance as to what should be eaten. But no matter how much enjoyment the eating of anything gives, if we find that the result is injurious to the body, there is no question as to whether temporary pleasure or permanent welfare of the body should be preferred. So in the case of the fine arts, no amount of temporary pleasure can ever be justified when it is known to result in a lowering of ideals and consequent perverted conduct. The pleasurable excitement given by the fine arts is only incidental; the main result is their effect upon action.

The truth that the fine arts have important practical effects beyond the mere giving of pleasure does not mean that either the artist or the individual enjoying the art creation must be conscious of these effects, any more than that, in the enjoyment of a meal, one must be conscious of the process of nutrition and the effect of the food upon the body; or that in play the child must be conscious of the preparation which he is receiving for the serious busi-

ness of later life. In the fine arts, attention should be centered upon those things which give thrills of appreciation and those things which through connection with these thrills of appreciation receive new values. The consequences take care of themselves, and any analysis of consequences would cool the feeling, bring in other associated ideas than those to be given value, and thus distract from the purpose-making process. In fact, it would center attention upon the solving of problems and thereby substitute the control-making process for the purpose-making process. So far as the individual is concerned at the time, the intelligent appreciation of fine arts is an end in itself, but, nevertheless, he receives the benefit for practical life. The essential value of his experience in studying the fine arts depends upon this benefit.

The short-sighted view which, in seeking the function of sciences, looks no farther than the immediate pleasure in contemplating scientific truth, dates back to the time of Plato and other classical philosophers. Some of the leaders of thought then reached the conclusion that the highest ideal towards which man can struggle on earth and which in heaven is the supreme attribute of the Divine Being is knowledge, — not knowledge for the sake of control, but knowledge for its own sake. Sciences, according to this view, are their own justification. Simply to know them repays fully the student for burning the midnight oil; the noble pleasure which the contemplation of truth inspires in him is the greatest reward for his long and arduous task.

This belief has a strong foundation in human nature. Individuals have an inborn desire to know, which is manifested throughout life, from childish curiosity to philosophic wonder. Copernicus, when a child fingering

unfamiliar objects, asked what they were and found pleasurable satisfaction when his nurse classified them with reference to the meanings he had already acquired. Copernicus, when he had become a man and had put away childish things, still retained his desire to know and became dissatisfied when some celestial phenomena were found to be strangers to the meanings which older astronomers had taught him. Since there was no representative of society to make the needed explanation, he worked patiently until he found a classification of phenomena which gave these strangers their places. Since the desire to acquire knowledge is so prominent in the scientist and philosopher, who give their lives to such work, their judgment with regard to the function of the sciences is liable to be prejudiced by this desire.

Does the pleasurable feeling in contemplating truth, however noble this feeling may be, mark the essential function of the sciences? Has nature given us hunger, love, and zest in the battle of life only that Satan may have a means by which to tempt us from the holy experience in our laboratories and libraries? Or do we go into our laboratories and libraries not only to contemplate the truth that may be found there; but also, — which is far more important, — to acquire means to satisfy our hunger, to consecrate our love, and to win in the battle of life our spiritual freedom?

The nature of knowledge itself gives the answer. Just as truly as the fine arts begin and end in practical life, and depend upon it for sustenance, so do the sciences. Ideas which are embodied in means of control, whether they are the data with which the sciences begin or the principles with which they end, are, as we have learned, plans of action that have been developed in overcoming

practical difficulties. Their meanings are just these uses. To be captured by some investigator and cooped in the pigeonholes of a scientific treatise for the mere purpose of being looked at, is indeed a sad fate for them. Shut off from their useful connections with practical action, they would become dead forms from which the life of meaning has departed. And then even the contemplation of them would lose its pleasurable satisfaction.

The "pure" scientist, who seeks truth for its own sake, represents only one phase of scientific activity specialized in the division of labor. He is justified in not looking beyond his immediate purpose of seeking the truth, because others, by applying his conclusions to the practical affairs of life, supplement his work and thereby give to it significance and value.[1]

History, the fine arts, and the sciences organize the individual's appreciations and means of control so as to make them the pathways through which life is guided to its fullest and best realization. The worth of these classes of subject matter in this service determines the value of the immediate pleasure and cultural influence which they give. Whoever does not see beyond this immediate pleasure reaches a short-sighted conclusion that would separate appreciation and theory on the one hand from practice on the other, and would eventually preclude the attainment of the highest values of either. Just as the parts of the human body get their full significance and value from their functional relations to the other parts of the body, so do the various forms of experience get their significance and value from their functional relations to the other forms of experience. Just as the parts of the body are members one of another, so these

[1] See pp. 262–264.

forms of experience are members one of another. Isolated they dwindle and die, but working together in the service of the whole, both they and the whole of which they are parts attain the highest welfare.

VI

The materialistic account of the factors in the development of adjustment to environment through the connecting of acquired reactions with systems of habits and through the forming of new reactions, supports our conclusions with regard to the two kinds of social patterns and with regard to the functions of history, the fine arts, and the sciences.

Natural science, to which we shall now look for additional evidence, supports the conclusion that, in determining *what* purposes and *what* means of control may be acquired by the individual, society furnishes, through the medium of matter, two kinds of patterns. The human organism is born with an incomplete nervous system, which is developed through interaction with the environment.[1] Stimuli from the environment and reactions thereto control the exercise of the nervous system, which "grows to the ways in which it has been exercised." The development of the reactions of the immature organism depends primarily upon the causal influence of actions of other organisms in the environment and changes which they have made in material things. For this reason the reactions developed after birth may truly be called a social inheritance. The environmental influence cannot, however, change directly the connections between stimuli and responses in the immature organism, but must exert its causal influence by affecting the processes through which the nervous system acquires new reactions. There

[1] See pp. 42–43.

are two kinds of such processes, — one, through which a new reaction that has been acquired is brought into intimate connection with a system of habits, and the other, through which the nervous system is modified so as to produce a new reaction. These, we have found,[1] are the material counterparts of the teleological processes through which new purposes and new means of control are made. Since changes in the nervous system depend thus upon the influence of the material environment, matter only is the medium through which one organism can affect another. Material forms which regulate the development of nervous connections in the organism may properly be called patterns.

Natural science explains, from its point of view, that the primary function of history and the fine arts is to develop purposes. When the same forms of reaction have been acquired in common by mature organisms, as in the case of the activities of the home, the state, and the church, these forms of reaction are fixed as social habits. Succeeding generations may acquire them not through interaction with the environmental conditions which caused them in the first place, but through interaction with these other organisms. If the immature organism does not imitate these forms of reaction, other organisms may even affect it adversely, making these forms of reaction necessary for adjustment to the other organisms. It may be possible that the situations to which these reactions originally made adjustment no longer exist. Habits that have become intrinsically useless may thus be perpetuated comparatively in isolation merely because they are necessary for adjustment to organisms which possess them. This handicap to the development of

[1] See pp. 92–96 and 122–126.

efficient adjustment is overcome only when these reactions are connected with the fundamental systems of habits which turn them to their true uses with relation to the environment. This is what history and the fine arts do. History causes the organism to make connections between acquired reactions and fundamental habits as they have occurred in the development of the race. The fine arts make similar connections which are useful in adjustment, but which may not have occurred previously. These forms of subject matter, which through material word symbols affect the immature organism, are created by group interaction. The particular line of least resistance along which nervous energy first makes the new connection is formed in some individual organism as the result of the interaction of this organism with others. This organism may then through words make a similar connection in other organisms.

The function of the sciences, according to the materialistic view, is to make adjustment more efficient in a way which corresponds to making means of control. When the form of adjustment to a concrete situation is modified through the influence of only this particular situation, this form of adjustment is connected with the total stimuli of the situation. To make the reaction function again, stimuli representing non-essentials as well as those representing essentials of the situation must recur together. This limits the effectiveness of the response as in the case of the colored woman who did not react in the situation dress-on-fire-and-rug-on-floor, although she had acquired the reaction to the situation dress-on-fire-and-blanket-on-bed, which was essentially the same. The reaction would function only when the non-essential stimuli peculiar to the blanket were present. A great

advance is made in adjustment when connections are made between the essentials of situations and the essentials of reactions that adjust the organism to them. In the case just cited, one step in that direction would be the connecting of the reaction shutting-off-the-supply-of-oxygen with the essential stimuli belonging to both blanket and rug in the situation something-on-fire-and rug-or-blanket-near-by. The further this is carried, — that is, the more situations are simplified so that one form of reaction will be connected with a larger number of situations, — the more effective does adjustment become. Reactions also may be simplified by eliminating non-essential movements. For instance, the woman might have attempted to wrap the blanket about a victim of fire in some special way that had been used under similar circumstances, when some other way would have fitted the situation better. The case cited above in which primitive man unnecessarily impressed the stamp of unwoven willow on pottery, is another instance of this. Organizing the essentials of reactions is just what the sciences do. The sciences, which appear largely in the form of word symbols that affect the immature organism, are created by group influence, since, although each advance is made through some particular organism, it is causally dependent upon other reactions which have been acquired under group influence.

The materialistic view supports the facts that means of control acquired under the guidance of history and the fine arts, and purposes acquired under the guidance of the sciences are developed only incidentally and not in the most economical ways. The efficiency of new reactions developed by history and the fine arts is not tested systematically as the sciences would test it, and

indeed, these reactions may not give the best adjustment to the environment. On the other hand, connections made by sciences between new reactions and larger systems of habits are not so intimate and thorough as those made by history and the fine arts.

Natural science reveals very definitely the short-sightedness of the belief that the essential function of history, the fine arts, and the sciences is to give pleasure. The organism is made for active adjustment to environment. In this adjustment process, the brain is the medium between the incoming nerves, which bring stimuli from the environment, and the outgoing nerves, which cause reactions to this environment. Brain changes are thus in the service of action. Since thoughts and feelings are the counterparts of brain changes, their fundamental significance, too, is practical. Indeed, history, the fine arts, and the sciences are biological necessities in the development of adjustment to environment; they mark a new chapter in this development.

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PROBLEMS

1. Why should teachers have definite ideas of the functions of the various kinds of subject matter they teach?

2. Name five ideals you have acquired as a result of your home influence and explain how you acquired them.

3. Name five means of control you have acquired in the home and explain how you acquired them.

4. Name five ideals you have acquired that were created or strengthened by the study of history or literature.

5. Name five valuable means of control you have learned from the study of science.

6. *a.* Can you trace any ideal you have formed to the study of Latin, mathematics, English grammar, or physical science? *b.* If so, explain how the ideal was derived from this study.

7. If a teacher believes that knowledge is an end in itself and not for the sake of action, what is the most serious error he is liable to make in teaching geography or grammar?

CHAPTER VIII

THE NATURE OF PATTERNS FOR PURPOSES—HISTORY AND THE FINE ARTS

The particular natures of history and the several fine arts are determined by various limitations under which they guide in forming new purposes. In giving an appreciative understanding of present social practices, history is limited to connecting them intimately with purposes in the service of which they were established. Literature, sculpture, painting, architecture, and music are free to represent necessary or probable connections between means and ends, irrespective of whether these have been experienced before, but are limited in various ways by different media of expression. A new and widely influential medium of artistic expression is the moving picture. The freedom of the fine arts in transferring values makes it easily possible for them to be perverted so as to give false appreciations of worth.

I

The problem of this chapter is to find in detail how history and each of the more important fine arts guide in forming new purposes. History is limited to past experiences; the fine arts are free to create probable situations that may not have actually existed. The fine arts differ one from another because they use different media of expression.

History and the fine arts, as we have learned, are the truest guides in forming new purposes. Sciences may develop purposes incidentally, but sciences are concerned essentially with making means of control, not with the far-reaching values which these means of control may serve. Social authority is widely influential and very

effective in developing purposes, but its guidance is unreliable and arbitrary. Social authority, it is true, puts a stamp of approval upon acts because they have been found worthful, just as governmental authority puts a coinage stamp upon gold because the gold is valuable in itself. But acts are less stable in value than gold; they may depreciate greatly when better standards are found; they may become even worthless when social conditions change; and yet those which have lost much or all of their value may still retain the social stamp. History and the fine arts, however, reveal the intrinsic values of acts as truly as the methods of the assayer test gold. Not only are they truer guides than social authority because they are more reliable, but they are truer to the nature of the individual, for they free him from arbitrary social authority. They lead him to accept purposes, not through external compulsion, but because his inner nature demands them, because he feels them necessary for personal development, through which he may realize his highest possibilities and become in the fullest sense himself.

Our problem now is to examine history and each of the more important fine arts separately, so that we may learn in greater detail how they function as purpose-giving subject matter. Each of them conforms to the law which controls the making of new purposes; each brings to consciousness valuable ends, associates intimately with these ends means of control, and under normal conditions, leads to action; but they do this in various ways, because of differences in scope and differences in media of expression used.

The wider distinction is between history and the fine arts. History gives accurately the essentials of past

experience, and is limited, therefore, to purposes that people have actually had and to the means they have used for realizing these purposes; the fine arts are free to create situations that are probable, but may never have existed in real life. A truly historical account of Julius Cæsar can ascribe to the conqueror only that which he actually said and did, but Shakespeare's *Julius Cæsar*, a work of literary art, may ascribe to him purely imaginary words and acts.

Because the fine arts may present purely imaginary situations, they can reveal between means and ends intimate connections that appear universally applicable, — true yesterday, to-day, and forever. Not limited to particular dates and localities, these experiences may be felt applicable to all men. When David says "The Lord is my shepherd," we may feel that through countless generations the Lord is the shepherd of all who love and follow Him. Turner's *The Slave Ship* makes us feel a horror for slavery, no matter when or where slavery exists. The fine arts, it is true, may represent historical situations; but, when this is done, the situation is taken out of its particular setting and universalized, so that its application belongs to no particular time and space. As Aristotle says, "There is no reason why some real events would not have that internal probability or possibility which entitles the author to the name of poet." [1]

The essential distinction between history and the fine arts may be summarized in the words of Aristotle: "It is, furthermore, evident . . . that it is not the function of the poet to relate what has happened, but what may happen, giving what is possible according to the law of probability or necessity. The poet and the historian differ not by writing in verse or in prose. The work of

[1] Aristotle, *Poetics*, IX.

Herodotus might be put into verse and it would still be a species of history, with meter no less than without it. The true difference is that one is related to what has happened, the other to what may happen."[1] This distinction will become clearer in the separate discussions of history and the several fine arts.

The fine arts differ one from another, because they are limited in various ways by different media of expression. Sculpture and painting are limited by marble and canvas to the presentation of a single situation, and must, therefore, bring to mind by implication whatever else is needed to create the new appreciation of value; poetry and music can present sequence of situations. This is why Aristotle calls sculpture and painting arts of rest as distinguished from poetry and music, which he calls rhythmic arts. Sculpture, which uses media of three dimensions without significant variation in color, excels in expression of form, but is greatly limited in expression of spiritual characteristics; painting, which uses as media colors on a plane surface, excels in the expression of spiritual characteristics, but is greatly limited in the expression of form. When early Greek artists represented perfections of the human body, they made statues, which could be viewed from all sides; when Christianity turned the attention of later artists to perfections of spirit, they painted pictures in which spiritual manifestations, appearing best from one point of view, which usually includes facial expression, are of prime importance. Again, sculpture is not suited as is painting to representing woodland and lake, mountain and valley. Architecture may be classed with sculpture and painting as an art of rest, with obvious limitations due to the special media used. Poetry, with its

[1] Aristotle, *Poetics*, IX.

symbolic words, differs from music, which makes a direct appeal to the feeling through combinations of tones. How the differences in media used for expression make differences in ways in which the several kinds of fine arts give ideals, will appear more definitely in separate discussions of the fine arts.

Sometimes fine arts are used in combination, as when poetry is set to music. Such combinations do not need separate discussions; an understanding of the natures of the separate arts reveals how they work together effectively in combination. They may work together easily, because all conform to the same general law in guiding to new ideals.

II

History gives an appreciative understanding of social practices by connecting them intimately with purposes in the service of which they were established. It thus prevents formalism, strengthens the desire to participate in valuable social practices, and makes social practices in all institutions plastic for improvement. Failure to understand the function of history has led to (1) factualism, (2) fiction, (3) sensationalism, and (4) the confusion of history with the social sciences.

A person who has entered a theater when the later scenes of an unfamiliar drama are being enacted, fails to appreciate the full significance of the present action, unless he learns what has taken place in the earlier scenes. We have entered the world after centuries of action have passed in the drama of the school, of the government, and of other institutions. In order to appreciate the full significance of what is being done, we, too, must learn what has taken place before; in other words, we must learn the history of these institutions.

The essential function of history is to give an apprecia-

tive understanding of present social practices by connecting them intimately with the purposes in the service of which they were established. Social practices, as we have learned, were originally means of control devised to overcome difficulties in the way of attaining things people considered worth while.[1] They were solutions of problems to which these difficulties gave rise. Trial by a jury of peers was a solution of the problem how to preclude prejudice which stood in the way of justice; the Chinese examination system was a solution of the problem how to select for office men most thoroughly versed in the Chinese Classics, and the use of special examination cells was the solution of the problem how to prevent candidates from getting assistance; a congress composed of senate and house of representatives was a part of the answer to the problem how to secure wise legislation, which would represent the will of the people and yet be saved from sudden fluctuations in popular opinion. After a social practice has been long established, the specific purpose for which it was created is gradually forgotten, unless there is something to keep men mindful of this purpose. As a result, the practice tends to become formal; it is continued merely because it is a custom indorsed by social approval, not because people have a discriminating sense of its value. It may be used, therefore, when the advance of science has revealed better practices which might be substituted for it; because, when men are not conscious of the purpose of a practice, they have no way to judge its effectiveness, since its effectiveness is its usefulness in attaining this purpose. Furthermore, it may be continued after the purpose which it originally served is no longer of value and its usefulness has thus

[1] See pp. 167–168.

been entirely outgrown. Examples of the one or the other of these conditions may be found whenever unreasoned conservatism stands in the way of beneficial reform. Men who justify their opposition to change in social practice merely on the ground that what was good enough for their forefathers is good enough for them, are under the bondage of formalism. To prevent formalism by increasing the true appreciation of those social practices which are good, so that men feel a new desire to perform them, and by making inferior social practices plastic for improvement, is an important service in the development of civilization. History performs this service by associating intimately social practices with the intrinsic purposes they serve.

History has been defined as "past politics." This is due to the fact that much attention has been given to the political aspect of social life, because the values of justice and freedom are so fundamental, and because the making of political institutions that do not yield to private advantage has been so difficult. But all social practices should have their histories,— industrial, educational, literary, scientific, philosophical, musical, religious, and all other kinds. Every practice, in whatever field it may be, needs to be saved from the deadening effect of formalism.

Because our present social practices are bewildering in complexity and because the purposes they serve are usually not directly evident, it is necessary to study the past in order to get an appreciative understanding of the present. Through tracing step by step their growth from simpler forms, we can more easily understand and appreciate the complex social practices of the present, as in the case of our getting an appreciative insight into the modern

textile industry by tracing the development of this industry from the days of the hand loom.[1] Furthermore, through a study of the past, we can find the purposes responsible for the origin, modification, and change in value of our various social practices. Men who were directly concerned with making new practices or changes in old ones were obviously of all men most clearly aware of the purposes which led them to do these things.

Brief illustrations taken from politics and education will show concretely that an appreciative insight into present social practices can be had only in the light of the past. The democratic government of the United States is an organized accumulation of ways of doing things political, which has been the outgrowth of many generations of struggle for human rights. It includes practices which were devised long before Magna Charta, the Bill of Rights, and freedom from England. Every change, however simple, in the development of the government, was made to overcome some difficulty in realizing a purpose, which, at the time, was keenly appreciated and consciously sought by those responsible for the change. The constitutional amendment requiring election of United States senators by popular vote is a recent example of this fact. This change in the practice of electing the United States senators was made mainly for the purpose of overcoming difficulties which the election of the senators by state legislatures put in the way of the expression of the people's will and for the purpose of precluding the evils which resulted from the election of state legislators with reference to their preferences for senatorial candidates rather than with reference to their fitness for enacting wise legislation. We must seek the motives for such

[1] For a detailed example, see pp. 286–289.

changes in the records of the times when the changes were made. A change made in one generation may, indeed, be modified many times in later generations, and both the original purpose and the ones in the interest of which modifications were made must, therefore, be understood in order to evaluate properly the practice in its resulting form. How could one get an appreciative understanding of the method by which the president of the United States is now chosen, except through a knowledge of the purposes and consequent modifications of practice that have come with the growth of the machinery of political parties? Again, a discriminating sense of the educational situation at the present time can be had only in the light of the past, where the practices are found consciously connected with the purposes which they were made to serve. The Hebrew ideal of national worship of Jehovah; the emphasis of Athenian philosophers upon contemplation as the highest good; the Roman love of power in the practical world; the other-worldly spirit of monasteries; the gallant dreams of chivalry; worths sought in the Italian Renaissance, Protestant Reformation, and French Revolution; ideals of statesmen, scientists, and industrial leaders, have all given the authority of their values in a greater or less degree to phases of present educational practice. The historical method is the only method whereby this intricate network of means and ideals can be unraveled.

While historians are studying the records of the past, they must not forget, however, that the ultimate guide to the relative importance of what they find is the appreciative insight it gives into the social life of the present. The value of history, as of all subject matter, depends upon its use in guiding action in the present; both the

teleological and materialistic views of human development have taught us this fact.[1] Whatever subject matter is not thus valuable is a mere incumbrance, worse than useless, because it consumes time and energy which might otherwise be given to that which is worth while.

If an historian should ignore the present social situation, he would have no guide for his investigations, and would, consequently, become lost in the maze of centuries of human activities. In order to make definite progress, he must be able to distinguish between important and unimportant matters. Just as one must look to the oak in order to understand the importance of the acorn; just as one must look to the socially developed man in order to understand the importance of the various tendencies to activity in the child; so one must look ultimately to the outcome of past events in our present social life in order to determine the relative importance of these events. As Davidson points out:

> When Columbus set sail across the untraversed western sea his purpose was to reach by a new path a portion of the old, known world, and he lived and died in the belief that he had done so. He never knew that he had discovered a new world. So it was with Socrates. When he launched his spiritual bark upon the pathless ocean of reflective thought his object was to discover a new way to the old world of little commonwealths and narrow interests, and he probably died thinking that he had succeeded. He did not dream that he had discovered a new world — the world of humanity and universal interests. But so it was; and though mankind are still very far from having made themselves at home in that world, and from having availed themselves of its boundless spiritual treasures, it can never again be withdrawn from their sight, nor the conquest of it cease to be the object of their highest aspirations.[2]

[1] See pp. 182–184 and p. 196.

[2] Davidson, Thomas, *The Education of the Greek People*, p. 118.

Again, the magnificent Roman court was the center of interest nineteen centuries ago. It seemed completely to overshadow the cross upon which, in an obscure part of the world, a man of lowly family, in a despised nation, was crucified between two thieves. The crucifixion seemed to affect only a few men in humble walks of life; even these went away discouraged. But the place of Christianity in our civilization to-day shows that the cross overshadowed in importance the palace of Cæsar. Browning suggests the dramatic reversal of contemporaneous judgment, which could not, of course, see the future, when he makes Cleon write to Protus, with reference to St. Paul:

> Thou canst not think a mere barbarian Jew
> As Paulus proves to be, one circumcised,
> Hath access to a secret shut from us?
> Thou wrongest our philosophy, O king,
> In stooping to inquire of such an one,
> As if his answer could impose at all!
> He writeth, doth he? well, and he may write.
> Oh, the Jew findeth scholars! certain slaves
> Who touched on this same isle, preached him and Christ;
> And (as I gathered from a bystander)
> Their doctrine could be held by no sane man.

It is true that the immediate purpose of an historical investigator may not go beyond the past event which he is studying. The making of history is too big a task for one man. There must be a division of labor in which investigators must delve in the records of remote events in order to determine, with the greatest possible accuracy, the facts with regard to these events. But the essential significance of the work of every special historical investigator depends entirely upon the value of the contribution he makes to history as a completed instrument

for social guidance. The man who, in a large factory, selects hickory for the spokes of automobile wheels must be intent upon selecting with the greatest accuracy the pieces of hickory to be used; but he might as well spend his time selecting pebbles, if it were not for the usefulness of the machine to which he makes a contribution. The significance and value of what he does depends upon that of the completed product to the making of which he contributes. This is as true in the making of history as in the making of automobiles.

Failure to recognize the essential function of history has led, among other things, to (1) factualism, (2) fiction, (3) sensationalism, and (4) the confusion of history with the social sciences, the function of which is to give control rather than appreciative insight. These things have interfered with the most effective making and use of history.

(1) It is of primary importance that history present as accurately as possible the facts with regard to past events; but this should not be permitted to obscure the importance of interpreting these facts, so that, in the completed history, they are connected with one another up to the present time. As in the case of the individual, society no sooner establishes a new practice for overcoming some difficulty in the way of what is felt to be worth while than it projects out of this situation other purposes and establishes other practices for attaining them. Through the centuries, the connection of social purposes is unbroken even to the present time. Facts not held together by this chain of purposes are disconnected, isolated, useless; they have no significant place in social development, and do not give a better appreciative insight into it. We cannot understand and appre-

ciate the various acts done by an individual unless we know his purpose, what he is trying to accomplish. Our first question is, What is he trying to do? Likewise, we cannot understand and appreciate social activities unless we know the purposes they serve. The mere fact that our national Congress meets as two houses gains its true significance only when we know the purpose for this division of the legislative branch of the government. Purposes are final causes, the only causes that history can recognize. They are as essential to history as efficient causes are essential to natural sciences; interpreting facts by connecting them with purposes is as much a *sine qua non* of history as explaining efficient causal relations of phenomena is a *sine qua non* of natural sciences.

Especially in the condensation of historical statement is there grave danger of interpretation being squeezed out, so that mere facts are left. This is an example:

> Robert the Wise (of Anjou) (1309–1343), the successor of Charles II of Naples, and the champion of the Guelphs, could not extend his power over Sicily where Frederick II (1296–1337), the son of Peter of Aragon, reigned. Robert's granddaughter, Joan I, after a career of crime and misfortune, was strangled in prison by Charles Durazzo, the last male descendant of the house of Anjou in Lower Italy (1382), who seized on the government. Joan II, the last heir of Durazzo (1414–1435), first adopted Alfonso V, of Aragon, and then Louis III, of Anjou, and his brother, René. Alfonso, who inherited the crown of Sicily, united both kingdoms (1435), after a war with René and the Visconti of Milan.[1]

Condensation of statement should be secured not by the omission of all interpretation, but by the omission of the less important facts and their interpretation, while the more important facts with their interpretation are retained.

[1] Quoted by J. H. Robinson in *The New History*, p. 3.

Commenting upon the factual quotation given, Professor Robinson says that "in treating the Italian Renaissance, this writer has chosen barely to mention the name of Francesco Petrarca, but devotes a twelfth of the available space to the interminable dynastic squabbles of southern Italy." Such lack of perspective is inevitable in the absence of interpretation, because the facts themselves, as we have learned, do not reveal their own importance. Their relative importance depends upon the parts they play in social development, and these parts are revealed only through interpretation, which places them in a connected purposive development.

When the relative importance of facts is lost sight of, undue emphasis is likely to be given to biographical details and to individual matters of little social consequence, because these are definite, simple, and often easy to find. They are valuable historically, however, only in the degree that they throw light upon social practice. Individuals such as Petrarch, Luther, and Rousseau, who figured prominently in social changes, acquired under social direction, as we have learned, their purposes, problems, and the bases for the solutions of these problems. In each case, the individual's solution was limited to the social problem as he understood it and to the use of social ideas he had acquired. In so far as his conclusions were adopted by society, biographical details which give a clearer understanding of these matters are truly significant, for they throw light upon a social movement. Biographical details which have no wide social significance are mere encumbrances to history.

(2) Contrasted with factualism is the tendency on the part of some writers to let fiction usurp the place of carefully verified and accurately stated facts in what purports

to be history. Extreme cases of this can be found in the writings of monks of the Middle Ages, where mere hearsay and uninvestigated statements of marvelous happenings were accepted as facts, if only they were in harmony with the preconceived interpretations which the writers wished to place upon them. Even in modern times, especially when the writer is strongly partisan, as in the case of Macaulay, a tendency to warp facts to fit prejudiced interpretations may be found. The evil of this is apparent.

(3) Another fault due to a failure to understand the true function of history is sensationalism. Detailed accounts of battle scenes and stories of non-essential dramatic episodes are instances of this. The latter need no comment. Warfare is a means through which men have settled conflicts of religious, political, economic, and other purposes. The desires that led men to battle may be of far-reaching historical significance, but the details of battles and of military campaigns do not give an insight into these conflicting values, the fate of which hangs in the balance. Military students, who wish to get an appreciative understanding of the practices of warfare, would find such accounts useful; but men in general, who have no need to become expert in managing military campaigns, would profit more by historical accounts that give an appreciative insight into institutional activities in which they are daily engaged.

Surely the sensationalism of war is not needed to arouse interest in the past, when the historian has before him the whole realm of values which, generation after generation, engrossed the attention of the people of the time and gave zest to their lives, values which have often been consecrated by great sacrifice made in their service.

We are of the same human nature as our forefathers, and able, therefore, to sympathize with them in their desires and difficulties. The situations of the past which were intensely interesting to them will produce no small degree of interest in us, if the essentials of these situations are presented with accuracy and vividness.

To reveal accurately and vividly the essentials of social situations in the past so as to make readers appreciate the values sought by the men of the time, imposes upon the historical writer a difficult task, for which the "yellow journalistic" appeal to primitive interests is an easy substitute. Just as cheap literature gets its interest from "blood and thunder," so does cheap history. In neither case does that which is given come close home to the daily lives of men and give significance and value to what they do.

(4) A failure to understand the essential function of history has led to confusing it with the social sciences, the function of which is to give control. History is concerned with what people actually did and why they did it; science is concerned with finding the causal relations of things so that the most effective means may be available, whether any one ever used them or not. It is not uncommon, indeed, as has been said in a previous chapter,[1] for sciences to show that practices established in the past are not the most effective for realizing the purposes in the service of which they were devised, as in the case of recent scientific conclusions as to the effectiveness of formal discipline in education.

As patterns for control, social practices of the past are no more adequate than the machinery of the past. Growth of civilization means the improvement of methods

[1] See pp. 179–180.

for attaining ideals as well as the development of new purposes. Older methods are cast off as inadequate when better ones have been devised to take their places. Political constitutions, religious creeds, methods of manufacturing, educational practices, are no sooner made than they are found in need of improvement, antiquated. Not many years ago, women supposed to be witches were burned to rid the world of untoward influences, slavery was justified by Biblical interpretation, guilt was tested by finding whether the accused man, when put into water, would sink with the weight of iniquity. As Professor Robinson says, "It is true that it has long been held that certain lessons could be derived from the past,—precedents for the statesman and the warrior, moral guidance and consoling instances of providential interference for the commonalty. But there is a growing suspicion, which has reached conviction in the minds of most modern historians, that this type of usefulness is purely illusory." [1]

The historian who confuses history with social sciences is liable to criticize the effectiveness of past social practices in the light of modern sciences, when such criticism serves only to confuse the real issue. As historian he is not concerned with the faults which modern sciences reveal in past practices, but with the faults that were recognized by the people of the time and that thus led to new purposes, new problems, and the changes in practices which the solutions of these problems brought about. In going beyond this, he brings foreign considerations into the discussion of an historical situation which is complicated enough as it is.

Emphasis upon control in historical writing has tended to bring history itself into disrepute. Men are led to

[1] Robinson, J. H., *The New History*, p. 17.

compare its effectiveness in giving control with that of social sciences, which are especially designed for control. In such comparison, history must always appear at a disadvantage. Much of the dissatisfaction with the history of education as a subject for the professional training of teachers is due to an attempt to use it to secure results in control, for which the history of education was never rightly intended. Methods of teaching, to cite one form of control, are not to be learned economically and effectually from the study of the writings of Plato, Quintilian, Rousseau, Pestalozzi, Herbart, and Froebel, but from the study of the most recent books giving a scientific treatment of this subject. The works of these reformers throw light upon certain stages in the history of education and thereby help us, so far as methods of teaching are concerned, to appreciate the ideals which the present practices serve and to understand the problems these practices are intended to solve; but the determination of the best solutions of these problems belongs to the field of science. From Plato's doctrine of formal discipline to Froebel's belief in a mysterious symbolism, many of the teachings of these reformers are not supported by the scientific conclusions of to-day.

History must always be a complement of the sciences, not a rival of them. History reveals the purposes underlying our institutional practices, it shows the ends for which they were intended, and thereby keeps alive social problems; but when the effectiveness of these practices is to be determined, when we wish to find whether the practices can be improved, we must close our histories and open our books in the social sciences, which organize activities according to their causal values for the sake of control. History saves us from the deadening influence

of formalism, — that is, of acting without appreciating the true purposes of our acts; the sciences show us how to improve our practices when we appreciate the ends these practices serve. Both are necessary to the best human development.

III

Literature incites feelings of worth mainly through words which symbolize strongly appreciated ideals and through the more direct appeal of rhythm. It then presents, either by direct statement or suggestion, a means of control which receives a crown of value through intimate association with this worth. Nature poetry keeps us mindful of fundamental values by making common things symbolic of these values.

A work of literary art in furnishing a pattern for a new purpose must incite feelings of worth. This step is the first in the process through which a new purpose is made.[1] Literature incites feelings of worth for the most part by means of words, which are material things connected in previous experience with feelings of worth possessed by the individual. Just as a painter who sees in imagination the glory of a sunset, presents what he sees to others by combining on the canvas various colors, so a literary artist who feels some worth which crowns an ideal, presents it to others by combining in their consciousnesses various feelings of value which natural endowment and past experience have already provided for them. These original and acquired feelings of worth are the stuff with which he must work. They appear as halos of ideals possessed by the individual, and may be called to consciousness by words which symbolize them. Prominent in literature, therefore, are words which symbolize strong feelings of worth, such as those of love in its various forms,

[1] See p. 72.

physical and moral valor, joyful satisfactions of nature, aversion to suffering, mystery of life, horror of death, hope of immortality, dependence upon and reverence for a Supreme Being. These were old when the world was young; they pulsate strongly in human experience. Guided by intuition, through which feelings are known and appreciated by being felt, not by objective mechanical construction, the literary artist combines them so as to make the feeling of worth which he wishes to express.

The music of the words can be used in literature to arouse feeling in addition to that which comes to mind with the ideals symbolized. Stately serious spondees, joyfully bounding anapæsts, and all other musical forms to which spoken language is subject, make a direct appeal to feeling. In Poe's *The Bells*, this music is very prominent. Listen:

> Hear the sledges with the bells —
> Silver bells!
> What a world of merriment their melody foretells!
> How they tinkle, tinkle, tinkle,
> In the icy air of night!
> While the stars that oversprinkle
> All the heavens, seem to twinkle
> With a crystalline delight;
> Keeping time, time, time,
> In a sort of Runic rhyme,
> To the tintinnabulation that so musically wells
> From the bells, bells, bells, bells,
> Bells, bells, bells —
> From the jingling and the tinkling of the bells.

Again, in *Annabel Lee*, the musical element is prominent.

> And neither the angels in heaven above,
> Nor the demons down under the sea,
> Can ever dissever my soul from the soul
> Of the beautiful Annabel Lee:

For the moon never beams, without bringing me dreams
Of the beautiful Annabel Lee;
And the stars never rise, but I feel the bright eyes
Of the beautiful Annabel Lee;
And so, all the night-tide, I lie down by the side
Of my darling — my darling — my life and my bride,
In the sepulchre there by the sea,
In her tomb by the sounding sea.

The form of poetry demands musical quality. The form of literary prose does not demand it, but prose, as well as poetry, may incite feeling by its music. Dickens's story of the death of Little Nell in *The Old Curiosity Shop* has an effective musical quality.

She was dead. No sleep so beautiful and calm, so free from trace of pain, so fair to look upon. She seemed a creature fresh from the hand of God, and waiting for the breath of life; not one who had lived and suffered death.

Her couch was dressed with here and there some winter berries and green leaves, gathered in a spot she had been used to favor. "When I die, put near me something that has loved the light, and had the sky above it always." Those were her words.

She was dead. Dear, gentle, patient, noble Nell, was dead. Her little bird — a poor, slight thing the pressure of a finger would have crushed — was stirring nimbly in its cage; and the strong heart of its child-mistress was mute and motionless for ever.

Where were the traces of her early cares, her sufferings, and fatigues? All gone. Sorrow was dead indeed in her, but peace and perfect happiness were born; imaged in her tranquil beauty and profound repose.

And still her former self lay there, unaltered in this change. Yes. The old fireside had smiled upon that same sweet face; it had passed, like a dream, through haunts of misery and care; at the door of the poor schoolmaster on the summer evening, before the furnace fire upon the cold wet night, at the still bedside of the dying boy, there had been that same mild, lovely look. So shall we know the angels in their majesty, after death.

But literature must do more than merely stir up feeling. If it did no more than this, it would not guide the individual to new ideals, but would only recall in various combinations appreciations he had already acquired. If a new ideal is to be developed under the guidance of a literary pattern, the halo of feeling which the literary work has brought to mind must be transferred to some means of control intimately associated with the appreciated worth. This means of control is, indeed, necessary to give unity to a literary work, for all the appreciations of value called forth are called forth to give this means of control a new halo of worth; they unite in it. Then the individual must act in realizing the appreciated value through the means of control associated with this value, but this last step is not provided by the literary pattern. It is left to follow as a result of the other two steps.

Let us now find these steps in several typical works of literary art. Owing to its brevity, simplicity, and directness, the *Twenty-Third Psalm* reveals the steps clearly. The function of this psalm is to give a new worth to the idea of the Lord as a Being to be worshiped and obeyed. The Hebrews had, at one time, been led to appreciate the Lord as a man made large, who walked in the Garden of Eden and talked with Adam and Eve. Later they regarded Him as a mighty warrior, irresistibly leading His chosen people. Still later they felt towards Him as towards a just judge, who would punish iniquity and reward righteousness. But in the mind of David there had developed a new ideal of Jehovah, a new value in worship and obedience. In the expression of this value, he gave to those of his own and later generations a work of literary art which would guide them to this new ideal of the Lord.

It is not necessary to suppose that the psalmist wrote his poem with the deliberate purpose of guiding others to the new ideal he appreciated. He may have sung out of the fullness of his heart, giving expression to the feelings that welled up within him. Intuition guided him, however, to call to mind ideals with strong halos of appreciation, to stir up feeling through the music of his words, and to associate intimately with the resulting feeling the idea of following the Lord as a means for realizing the values appreciated.

Pastoral life had developed in men of his nation a feeling of value associated with the good shepherd, who loved his sheep, protected them from danger, and kept them from want. When the psalmist says "The Lord is my shepherd; I shall not want," the feeling towards the shepherd becomes associated with the idea of following the Lord, in accordance with the law controlling the making of new purposes; for following the Lord appears to be the means through which this value may be realized in the lives of men. The poem then leads to the enrichment of appreciation by dwelling upon more specific values. Green pastures and deep wells of cool water would naturally call forth a glow of feeling in the minds of men accustomed to the vicissitudes of pastoral life. With this added feeling is the statement that the Lord is the means to the realization of the value it crowns. One by one, different appreciations, including those created by the music of the verse, are thus carried over to the idea of the Lord as the poet continues:

He restoreth my soul: he leadeth me in the paths of righteousness for his name's sake.

Yea, though I walk through the valley of the shadow of death, I will fear no evil: for thou art with me; thy rod and thy staff they comfort me.

Thou preparest a table before me in the presence of mine enemies: thou anointest my head with oil; my cup runneth over.

Surely goodness and mercy shall follow me all the days of my life; and I will dwell in the house of the Lord for ever.

As all of these feelings of value fuse, they make a new crown of appreciation for the idea of following the Lord, and thereby give men a new purpose in obedience and worship. Thus is the psalm a pattern for guiding experience in making a new ideal.

In Browning's *Cleon*, which has been quoted in part in the discussion of history, the reader feels Cleon's despair in the attempt to satisfy the deepest longings of his soul through philosophy, art, and pagan religion; while heightened in effect through contrast with these appear the values for which Cleon yearns. He says:

"But," sayest thou — (and I marvel, I repeat,
To find thee tripping on a mere word) "what
Thou writest, paintest, stays; that does not die!
Sappho survives, because we sing her songs,
And Æschylus, because we read his plays!"
Why, if they live still, let them come and take
Thy slave in my despite, drink from thy cup,
Speak in my place. Thou diest while I survive?
Say rather that my fate is deadlier still,
In this, that every day my sense of joy
Grows more acute, my soul (intensified
By power and insight) more enlarged, more keen;
While every day my hair falls more and more,
My hand shakes, and the heavy years increase —
The horror quickening still from year to year,
The consummation coming past escape,
When I shall know most, and yet least enjoy —
When all my works wherein I prove my worth,
Being present still to mock me in men's mouths,
Alive still, in the phrase of such as thou,
I, I the feeling, thinking, acting man,

The man who loved his life so over-much,
Shall sleep in my urn. It is so horrible,
I dare at times imagine to my need
Some future state revealed to us by Zeus,
Unlimited in capability
For joy, as this is in desire for joy,
— To seek which, the joy-hunger forces us:
That, stung by straitness of our life, made strait
On purpose to make prized the life at large —
Freed by the throbbing impulse we call death,
We burst there as the worm into the fly,
Who, while a worm still, wants his wings. But no!
Zeus has not yet revealed it; and alas,
He must have done so, were it possible!

Live long and happy, and in that thought die,
Glad for what was! Farewell. And for the rest,
I cannot tell thy messenger aright
Where to deliver what he bears of thine
To one called Paulus; we have heard his fame
Indeed, if Christus be not one with him —
I know not, nor am troubled much to know.
Thou canst not think a mere barbarian Jew
As Paulus proves to be, one circumcised,
Hath access to a secret shut from us?
Thou wrongest our philosophy, O king,
In stooping to inquire of such an one,
As if his answer could impose at all!
He writeth, doth he? well, and he may write.
Oh, the Jew findeth scholars! certain slaves
Who touched on this same isle, preached him and Christ;
And (as I gathered from a bystander)
Their doctrine could be held by no sane man.

Thus through delicate suggestion, which is stronger than bold affirmation because the reader himself leaps to the discovery, Christianity is recognized to be the means of satisfying the deepest yearnings of the human soul. In this flash of intimate association, the thrill of appreciation

is carried over to Christianity, which receives a brighter crown and is, therefore, more strongly cherished.

The play *Hamlet* is a guide for developing the purpose of prompt action in doing one's duty. Hamlet, a young man of splendid idealism, returns from university life to find a shocking situation in his home. His father, who was king, has been murdered, and his mother is living in unholy union with the murderer, her former husband's brother. The demands of moral law written deep in human nature through centuries of experience could not have been expressed more clearly than in Hamlet's words,

> The time is out of joint; — O cursed spite,
> That ever I was born to set it right!

This is the key to the whole situation. The ideals created in his earlier experience cry out for realization. He is clearly conscious of the fact. But what does he *do?* Opportunity after opportunity is given him to strike for their realization, but each time he hesitates, trifles with opportunity, procrastinates action. With each failure to act, he is caught more tightly in the web of fate, from which obedience to the moral law would have delivered him, until the consequences are appalling. Most pathetic of all, Ophelia, Laertes, and Hamlet himself, are unnecessarily sacrificed on the altar of procrastination, because Hamlet has neglected opportunities to realize an ideal the authority of which he felt from the first. Each calamity is pictured through description and suggestion in such manner as to intensify feeling, and each in turn is discovered to be the consequence of Hamlet's procrastination. "Whatsoever a man soweth, that shall he also reap;" the value of the sowing is the value of the harvest. Not through mere intellectual symbolism,

but in the pulsations of his own heart does the reader find a new ideal value in immediate action to realize his ideals, a value which tends to make his practical life more effective. The essential function of tragedy is indicated by the last words of that master of tragedy, Euripides: "O gods of mortals, give humanity light, that it may learn the source of its griefs and learn to avoid them!"

Nature poetry not only creates new purposes, but also keeps us mindful of them by associating them with common things about us. Quotations from the Bible are sometimes hung in homes with a view to keeping the occupants mindful of religious ideals which should guide their daily lives. In an analogous way, nature poetry makes objects that we meet everywhere remind us in an effective way of the purposes which are important in human life.

The little flower is given a new crown of value as the means of revealing what God and man are, when Tennyson says:

> Flower in the crannied wall,
> I pluck you out of the crannies,
> I hold you here, root and all, in my hand,
> Little flower — but *if* I could understand
> What you are, root and all, and all in all,
> I should know what God and man is.

One who has acquired this appreciation sees in the flower the mystery of human life and is carried over the petty purposes of the moment to comprehensive ideals. These ideals tend to annul the momentary desires which conflict with them and to intensify those which are in harmony with them. They bring the individual into the presence of the more fundamental values of life, which as purposes take leadership in guiding his conduct.

The individual who has fully appreciated Bryant's *To a Waterfowl,* is reminded of God's care, when he sees the bird soaring above him. Two stanzas are quoted:

> There is a Power whose care
> Teaches thy way along that pathless coast,—
> The desert and illimitable air,—
> Lone wandering, but not lost.
>
> . . . . . .
>
> He who, from zone to zone,
> Guides through the boundless sky thy certain flight,
> In the long way that I must tread alone,
> Will lead my steps aright.

To repeat Mrs. Browning's verses which allude to Moses and the burning bush,

> Earth's crammed with heaven,
> And every common bush afire with God;
> But only he who sees takes off his shoes.

Nature poems make us see. They make us live in the presence of fundamental values.

In dealing with nature, the poet is often led to make things appear to participate in human experience; or, in other words, to personalize them. A new world of values is thus opened for common things, so that these things appear not only as means to the realizing of human ideals, but also as consciously sharing with man the process of realization. Longfellow's *Autumn,* which is here quoted in part, exemplifies this personalizing.

> There is a beautiful spirit breathing now
> Its mellow richness on the clustered trees,
> And, from a beaker full of richest dyes,
> Pouring new glory on the autumn woods,
> And dipping in warm light the pillared clouds.
> Morn on the mountain, like a summer bird,

Lifts up her purple wing, and in the vales
The gentle wind, a sweet and passionate wooer,
Kisses the blushing leaf, and stirs up life
Within the solemn woods of ash deep-crimsoned,
And silver beech, and maple yellow-leaved,
Where Autumn, like a faint old man, sits down
By the wayside a-weary. . . .

Burns reads human experience into the mouse when he says:

Thou saw the fields laid bare and waste,
An' weary winter comin' fast,
An' cozie here, beneath the blast,
Thou thought to dwell,
Till, crash! the cruel coulter past,
Out thro' thy cell.

"Ambitious ocean," "scolding winds," "threatening clouds," "joyful sea," — such examples are innumerable.

It is unnecessary to give any extended illustrations of prose literature, because prose literature is like poetry, except that its form only permits rather than demands a musical quality. Lincoln's speech at the dedication of the cemetery at Gettysburg creates a strong appreciation by calling to mind the consecration of the soldiers who gave their lives for their country, and by adding to this appreciation the effect of rhythmic language. In turn, this appreciation is carried over to the cemetery which symbolizes it and which holds this value in a permanent, objective way for all men who have been led to appreciate it.

Prose fiction, whether it associates human acts with their consequences or whether it gives deeper appreciations of nature, conforms as does poetry to the law controlling the making of new purposes. Through imaginary

situations artistically presented, feelings of value are incited and carried over to ideas intimately associated with them as means to end. If this leads to action, the reader acquires new purposes.

IV

Sculpture calls forth feelings of worth mainly by symbolising a strongly appreciated climax of action and by the more direct appeal of beauty of form. It also suggests the means which is to receive value through intimate association with these feelings of worth.

Sculpture must make the best of the one unchanging presentation to which it is limited. What poetry would tell in successive verses, sculpture must present all at once. The kind of appeal that poetry makes through rhythm and harmony of sounds, sculpture makes through beauty of physical form. A statue, in so far as it is symbolic, must represent the climax of events, the part richest in feeling. In the best sculpture, as in the case of the *Laocoön Group*, the sculptor, instead of representing the climax directly, represents a situation near it, so that the excited imagination of the observer may be free to create its own image of the climax. The climax represented only in the imagination of the observer arouses stronger feeling than the climax directly represented by the statue would arouse. The statue must associate intimately with the strong feeling of value excited some means for realizing this value.

The statue of *Olympic Zeus* leads to an appreciation of a supernatural personality just as truly as the *Twenty-Third Psalm* leads to an appreciation of the Lord. Colossal size, perfect physical development, and bodily control that makes it appear easy for Zeus to rise and hurl a thunderbolt, incite an appreciation of power. Every

feature impresses the observer with the dignity and nobility of the god. Feelings of value are called to consciousness by beauty of form. As all these appreciations fuse, they are carried over to the supernatural personality represented, just as various appreciations called forth by the *Twenty-Third Psalm* are carried over to the Lord. When universalized, the statue gives an appreciation of divinity, although the observer may not believe that the pagan god truly represents this divinity.

The *Laocoön Group* illustrates an instance in which sculpture symbolizes a story that must be understood, if the new ideal is developed. One could appreciate this work of art without understanding the meaning symbolized, just as one could appreciate rime and rhythm of poetry in a language which he did not understand. But as it is necessary to know the meaning in order to acquire the essential value of poetry, so it is necessary to know the meaning in order to get the essential value of statuary. An individual who did not understand the story represented by the *Laocoön Group* might gain only the feeling that serpents should be avoided.

There are several stories which the *Laocoön Group* may represent, but the same essential idea runs through them all. The story most common now is given by Vergil.[1] Laocoön, a priest of Apollo, advised against taking the wooden horse of Ulysses within the walls of Troy, and gave expression to his feelings by hurling a spear against the horse. In this way, Laocoön opposed the gods who were supporting the strategy. As a punishment, two serpents came from the sea, and, when the father was making a sacrifice, attacked the two sons. Suddenly apprised of what was taking place, Laocoön rushed to

[1] *Æneid*, Book II.

rescue his sons, but was caught with them in the deadly coils. An earlier story makes Laocoön suffer because he had desecrated the temple of Apollo, and thus brought the disfavor of the god upon him. Still another story is that Laocoön offended Apollo by marrying against the will of the god. In all of these accounts, however, there is the one essential idea that Laocoön was punished because he opposed the will of some supernatural power.

The statue thrills the observer with the horror of the situation as he sees the agony expressed in Laocoön's face and realizes that the father in his death struggle is helpless to save either himself or his sons, upon whom his rash act has brought calamity. The parent's grief over the hopeless death struggle of his two innocent sons is added to the physical torture he suffers. Beauty of form and strength of body of those about to be destroyed add to the pathos of the situation.

As the tragic scene is carried to its climax in the excited imagination of the observer, it stirs deeply his feeling. At the same time he recognizes that the punishment of Laocoön came as a result of offending a supernatural power. The will of the gods thus acquires a new appreciation; the observer feels the superiority of a supernatural power, which, as the work of art becomes universalized, does not necessarily mean the particular personalities in whom the Greeks believed, but whatever supernatural power the individual may recognize. As in the case of new value given to Christianity by the poem *Cleon*, not mere intellectual recognition of cause and effect, but the calling forth and transfer of strong feeling, mark the development of the new ideal.

V

Painting functions similarly to sculpture, but differs from sculpture in that it uses colors and is limited to the representation of one point of view.

Painting is limited like sculpture to one unchanging presentation, but differs from sculpture in that it uses colors and is confined to two dimensions. Although painting can give only one point of view, it has the advantage of warmth of color and of power to represent finer evidences of the inner life. The face of a statue is cold, dull, rigid; but the face in a picture is warm and life-like, and reveals spiritual qualities of the person represented. When Christianity turned the attention of artists from physical form to spiritual life, painting was used to represent that peace and beauty which God gives to those who do His will. The advantages of painting over sculpture in representing natural scenery are obvious. Where a scene includes numerous objects and where color is an important factor, painting excels sculpture.

The *Sistine Madonna* may illustrate how painting guides to a new ideal. This picture excites complex appreciation which includes that of noble womanly character, the innocence and helplessness of infancy, mother's love, religious value suggested by the halo and by the angel faces, and sensuous beauty of form and color. This complex feeling of value is transferred to the Madonna, who appears to be the means through which these values have been made incarnate.

Turner's *The Slave Ship* pictures the sun about to give over to the darkness of night a scene freighted with horror. In the distance is a storm-battered slave ship, and nearer

by, in the water, are manacled human beings, helpless amid stormy waves and fierce denizens of the sea. As one's soul is stirred with horror, the feeling is carried over to slavery, which is felt to be the cause of it all. Harriet Beecher Stowe's *Uncle Tom's Cabin* develops an aversion to slavery by making it appear in a series of incidents as the cause of great human suffering; Turner's *The Slave Ship* exerts the same kind of influence, but is confined to the representation of one incident. While the picture has the disadvantage of telling the story through only one incident, it has the great advantage of making a concrete vivid appeal to the imagination rather than one dependent upon words more or less general in meaning, and also the advantage of presenting all at once elements of feeling which the novel must give in successive passages.

Studies in still life have a function similar to that of nature poetry. Appreciations of natural beauty accentuated in the picture with its satisfying proportions and delightful color harmonies, ideals suggestive of rest, peace, freedom, and of the joy and mystery of life, give richer value to nature about us, so that we live in the presence of these greater worths and are practically affected by them.

VI

Architecture calls forth feelings of worth by beauty of form and by the values of ideals it symbolizes. It also suggests that to which the worth is transferred, as, for example, religious faith in the case of a magnificent cathedral.

Architecture is usually included among the fine arts, although it borders closely upon the "useful" arts. The palace and the temple are to shelter people as well as to incite appreciation. Buildings may be useful, however,

without appealing to appreciation, and such appeal is, therefore, something in addition to this usefulness.

Architecture calls forth a feeling of appreciation by equalizing conflicts of forces; it is adapted to express power of mere material objects, as sculpture is adapted to express power of the human body, and painting and music, spiritual power. A column, because of its rigidity, resists the force of gravity in what it supports. A column that is unnecessarily massive with relation to the weight of the superstructure, or is so slender as to give the impression of weakness, causes a feeling of dissatisfaction. In the one case, there appears to be waste of energy, and in the other, there appears to be strain. A column should be of greatest diameter in the middle where the greatest strength is needed, and the superstructure should be placed upon it so that the weight can be supported to the greatest advantage. A favorable feeling is caused when forces are nicely balanced. Stability gives a feeling of satisfaction. This is true not only of columns, but of all architectural forms.

Our feelings with regard to equalization of forces are due to the tendency to personalize objects, to read our experiences into them. Our feeling of resistance against opposing objects is essential to the idea of force which we read into other objects. We sympathetically imagine that a column supporting too heavy a superstructure is strained with the burden. The author once saw on an elaborately decorated theater a heavy cornice supported by figures of men in horizontal position with feet against the wall and backs against the cornice. This appeared inartistic, because it gave the observer, through sympathy with the figures, an annoying feeling of instability. He did not stop to reason about it; he immediately felt it.

This personalizing excites some appreciation even for products of the " useful " arts. For this reason, the nice adjustments of forces in the modern locomotive or automobile excite greater appreciation than do the clumsy adjustments in the earlier types.

Our own personal feelings in the use of the architectural product also may appear. The curves of an ax handle would be just as graceful, if reversed, but would give one a feeling of dissatisfaction, because they would not be adapted to the use intended. It would be uncomfortable to use such an ax handle. For the same reason, a disproportionately small entrance to a building, or a ceiling that appears to be too low, gives an unpleasant feeling.

Largeness and durability are also factors of appreciation of architectural work. A great cathedral is more impressive than an exact copy of it in the form of a small model. The forces involved are greater in the former instance. Permanence and strength make stone more effective material than wood, not only for the sake of the building, but also for the sake of appreciation.

In addition to the appreciation excited by beauty of form, architecture gives appreciation by symbolizing ideals. Ionian, Dorian, Attic, Queen Anne, Colonial, — all of these types are symbolic of past civilizations and rich, therefore, in ideal associations. When Napoleon exclaimed, " Soldiers, from yonder pyramids forty centuries look down upon you," he felt an appreciation of the pyramids for what they symbolized, as well as for their durable material, stable form, and magnificent size.

Whatever may be the causes of appreciation, — whether satisfactory proportion, size, or ideals symbolized, — is carried over to the social institution or whatever else the observer is led to associate with the appreciated values

as a means of realizing them. A massive stone building causes a feeling of security which may be transferred to the bank or trust company it shelters; a stately temple of justice arouses feelings of dignity and power which may be transferred to the courts; a magnificent cathedral may in like manner make religious faith appear more noble and authoritative. Architecture is thus a permanent guide for the developing of feelings of worth which create new ideals.

VII

Music is especially strong in direct appeal to feeling, but is more or less indefinite in suggesting that to which appreciation is transferred.

Music is less symbolic than literature, painting, and sculpture, and is stronger than other fine arts in direct appeal to feeling. The murmuring of the brook, the whispering of leaves, the song of the bird, the cry of the wolf, the roar of waves, the crash of thunder, and many sounds of the human voice, impress one with a wide range of feelings. They are the language of nature that speaks directly to the heart of man.

As in the case of the other fine arts, appreciation of a musical composition is built up through the uniting of appreciated elements. Just as words are combined into meaningful sentences and paragraphs, so musical tones are combined into larger units. In the degree that these combinations are not felt, the music becomes a confusion of tones. As a key sentence guides the reader to the appreciation of the unity of a paragraph, so the *motif*, made prominent in its simplicity at the beginning of a complex musical composition, guides the hearer to appreciate the unity of tones. Now one part and now another

of the harmonic structure is made to stand out until recognized, so that its effect can be felt when it is less accentuated in a manifold elaboration of tones later.

In addition to making a direct appeal, music increases appreciation by calling to consciousness strong ideals which it symbolizes. His country's national anthem heard by a patriot in a foreign land is a forceful example of this. Music which one has associated with happy days of one's youth in home and church gains an enhanced value due to what it represents. The wedding march and funeral dirge excite stronger feeling on account of what they symbolize. Symbolization is most frequently due to songs, in which the music is expressed in the form of words. The words carry with them not only tones, but ideals also, as in war and love songs, and in religious hymns.

In accordance with the law controlling the making of new purposes, feelings of value excited by music are carried over to whatever is intimately associated with them. In a song, words symbolize the idea that receives the new value. When music and poetry are thus combined, not only is there a double source of appreciation, but the transfer of feeling is more directly guided. Value may be given to the place to which one must go in order to hear the music, as the church, the school, the theater, or the home. Ideas to receive new values may be suggested by the music itself; for, as imagination runs free, moods created by the music bring to mind ideas that previously have been associated with these moods.

The purpose-giving influence of music has been recognized in a practical way from the time of primitive man, who strengthened his courage with the war song and developed his religious awe for mystic divinities by the

religious chant. Early Athenians made much use of music to develop ideals of patriotism and religion in the youths preparing for citizenship. For centuries, music was prominent in religious education. To-day in many practical ways the fact appears that music not only intensifies our joys and soothes our sorrows, but also gives authority to many purposes, which take leadership in action.

VIII

In the moving picture, a new medium for artistic expression has been found.

A new medium for artistic expression has appeared in the moving picture, which is widely influential in guiding the development of ideals. Owing to the newness of this medium, the full range of its possibilities has not yet been discovered. Although it is associated with the expression of various forms of literature on the stage, its possibilities are different. Compared with the spoken drama, it is greatly limited in the use of words, but it has far greater possibilities in the scope of action directly presented, in the rapidity with which scenes are changed, and in the power to stress essential parts of a complex scene by means of the "close-up." The law controlling the development of new purposes and the applications of it made in the discussion of literature and painting, suggest how the moving picture may guide in forming new ideals.

IX

Because of the freedom of the fine arts in making associations, they may be perverted so as to give false values, which become subversive of human welfare. The same work of art may influence two persons in quite different ways.

The freedom of the fine arts in selecting appreciations of worth and ideas to which these feelings are transferred, is beset with certain dangers. Relations of means and ends may be stated or suggested when internal probability or necessity does not justify such connections. As the fine arts appeal to feeling rather than to critical rational judgment, the subtle transfer of feeling from the end to some idea associated with it, may take place without the individual's discovering that his association is not justifiable and that the resulting appreciation is injurious. There is danger, therefore, that the function of fine arts be perverted so that they give false values, which become subversive of human welfare when they are made guides of action. This is the case when admiration of physical bravery is associated with deeds of an outlaw, as in some thrilling novels written for boys. War and peace become unduly glorified as valuable in themselves by association with appreciations that misrepresent the value of the one or the other. The creation of false values in this way is a common occurrence.

In painting, sculpture, and music, the character of the appreciation excited and that of the idea which receives the new value are dependent more or less upon suggestion. Because different appreciations and ideas are called forth by suggestion, one person may feel that a work of art is immoral in its influence, while another may feel that the same work of art is moral. Both judgments may be

right for the individuals concerned. The influence upon any person or group of persons cannot be determined until what is suggested in each case is known.

X

In showing how history and the several fine arts connect reactions with fundamental systems of habits, natural science gives the physical counterpart of the ways in which they create feelings of value and associate with them means of control.

Let us now consider history and the fine arts from the point of view of natural science. Since history and the fine arts are purpose-giving subject matter, their nature, from the materialistic point of view, may be found in the natural science explanation of how new purposes are made. They give stimuli which tend to open fundamental channels of expression, and, at the same time, open less important channels so that the latter become united with the former. When the otherwise less important reaction has become an integral part of a fundamental system of habits, a check in it is a check in the system, and is, therefore, accompanied by the stronger feeling of value that goes with the system.

Before the War of 1812, shipping activities in the New England States were important in the adjustment of organisms to the environment. The War of 1812 checked the ocean commerce and thereby interfered with the fundamental habits acquired by the people of New England in their adjustment to environment. In the reaction to this new situation, certain acts of collecting tariff on imported goods were developed in accordance with the process through which new reactions are formed. The more fundamental habits of living functioned better, when, as a result of the tariff, activities of manufacturing

were developed. In time, collecting a tariff became fixed as a social habit and was transmitted in a greater or less degree through imitation, the younger generation continuing what the older had begun. In the degree that it was transmitted through imitation, it became isolated from the system of habits in connection with which it was developed. History restores this connection. On the side of consciousness, the activity of collecting the tariff is a fact, and the system of habits with which the tariff is connected appears as a purpose. Connecting reactions with habits in relation to which they have developed, is paralleled on the side of consciousness by the experience of interpreting facts. When the reaction has been reunited with the more fundamental system of habits, tension in the reaction is paralleled in consciousness by a feeling of value that belongs to the system of habits of which the reaction is now an integral part. A check in it is a check in the whole system of habits.

As time passed, situations changed and new difficulties arose in adjustment, so collecting a tariff was modified and connected with other habits in reaction to environment. These habits represent on the side of consciousness new purposes which came in to modify the tariff. It is not necessary to give them in detail here, because in making these new connections, history merely repeats what has been explained in the preceding paragraph as the parallel of interpretation.

In Browning's *Cleon*, the fundamental system of habits having to do with self-preservation is stimulated under conditions that make its conscious accompaniments appear, and, at the same time, activities peculiar to Christianity are similarly stimulated. The partly opened channels run together so that activities represented by

Christianity become a part of the more fundamental system of habits. Stimulating the system of habits corresponds to creating an appreciation, and connecting activities of Christianity with it corresponds to associating these activities as means to the appreciated end. If the activities of Christianity are checked, the conscious parallel now becomes that of the value of the whole system of habits; for the check in the activity is a check in the system of which it is now an integral part. This is the parallel of the transference of value.

In the play *Hamlet*, stimuli are such as to open in a greater or less degree strongly fixed channels of response that would turn one away from suffering and death. On the mental side, this corresponds to inciting certain appreciations of value. Then nervous connections necessary for prompt action are associated with these habits as necessary to their proper functioning. This corresponds to associating prompt action, the opposite of procrastination, with the value as the means of realizing it. Afterwards, when prompt action is checked, the mental accompaniment is that which belongs to the more fundamental system with which it has been connected; for checking this particular reaction now is checking the whole system of which it is a part.

The difference between history and the fine arts is that history gives stimuli connecting only those channels which have been connected at one time or another in organisms of earlier generations, whereas the fine arts may give stimuli which make connections that have not existed in organisms of earlier generations. The fine arts are distinguished one from another by the differences in the kinds of stimuli they give, as words, tones, and colors, and by the consequent differences in the ways in which

they open channels of fundamental habits and connect particular reactions with these channels.

When the fine arts, in modifying the complex automatic switchboard of the brain, do not organize reactions in ways to give better adjustment, but, on the contrary, connect particular channels of reaction and fundamental systems of habits so as to interfere with adjustment, the physical parallel of an immoral influence appears. The reader of an immoral novel or the observer of an immoral moving picture may, through wrong organization of channels of response, react in ways that bring injurious consequences. Because the fine arts are not limited, as is history, to connections that, at one time or another, have actually been made and accepted in social practice, it is easily possible for them to make connections that interfere with adjustment. Because of the fact that stimuli given by some fine arts, as sculpture, painting, and music, may excite, as a result of previous influences, quite different tendencies to response in different organisms, the same work of art may be beneficial to one organism and injurious to another.

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PROBLEMS

1. Should the achievements in science and industry have a less important place in our school history than the achievements in war?

2. In a continued story in a magazine, the later instalments are sometimes preceded by a summary of the earlier part of the story. Show that the function of history is analogous to the function of this summary.

3. In the professional training of teachers, what is the value of the history of education?

4. Find in some textbook in history a section that is largely factual.

5. May history appropriately be called "social memory"? Explain.

6. In what important ways do you believe the content of the history courses you studied in the high school could have been improved?

7. How could your study of literature in the high school have been made more profitable to you?

8. Why is it important to develop in children a taste for literature and other fine arts?

9. Having selected three poems and three pictures, show what purpose is enriched by each and how this enrichment is caused.

10. Show that in the *Twenty-Third Psalm* or in some other work of art the idea to which ideal value is to be transferred is the basis of the unity of the work of art.

11. Do you believe that in addition to training the pupils to sing, the public school should, through courses designed especially for the purpose, develop in them an appreciation of the best music, instrumental as well as vocal? Explain.

12. Criticize the following: "The psychological purpose of aesthetic education . . . is to promote the pure, unselfish joy of life, to enable us to see and appreciate the beautiful wherever it exists, and when possible to produce it where it is not, but should be."

13. Was the moral influence of some "picture show" you attended recently good or bad? Explain.

CHAPTER IX

THE NATURE OF PATTERNS FOR CONTROL — THE SCIENCES

The function of the sciences is to describe and explain in the simplest manner the behavior of things, in order that these things may be used most effectively in control. This description and explanation require the abstracting of things from values, the considering of special aspects of these things, the reducing of them to elements, and the finding, on the basis of efficient causation or logical cogency, of laws descriptive of how these elements behave singly or in combination. The fact that the sciences are outgrowths of ordinary experience accounts for the following: their logical classifications of phenomena are normally also "psychological"; the pure sciences are an intermediate stage in the development of control and are supplemented by the "applied sciences"; the normal approach to the pure sciences begins with practical activities. The classification of the sciences develops slowly and can never be complete. The beliefs that the sciences give insight into reality or speak authoritatively about ultimate values, are erroneous.

I

The function of the sciences is to describe in the simplest manner the behavior of things, in order that these things may be used most effectively in control. Each science (1) considers things apart from all feelings of value; (2) deals with only one aspect of them; (3) reduces them, from its special point of view, to their simplest parts, or elements; and (4) finds laws which describe how these elements behave, both separately and in combination.

The sciences are the most valuable guides in developing means of control. They give control in the form of widely

useful organized principles rather than in the form of a multiplicity of isolated facts; they increase rapidly man's power over nature by substituting a definite method of investigation for the trial and error method of primitive man. As Karl Pearson says, "In the capacity he has evolved for resuming vast ranges of phenomena in brief scientific formulae in his knowledge of natural law, and the foresight this knowledge gives him, lie the sources of man's victory over other forms of life, from the brute power of the wild beast to the subtle power of the microscopic bacillus of some dread disease." To find more definitely how sciences guide in developing control, is the problem of this chapter.

Things of the world act in ways of their own. They are rigidly stubborn in nature; they always, under the same conditions, act persistently in the same ways. This fact is termed the uniformity of nature. Water expands when it freezes and ice absorbs heat when it melts; light and sound vary in intensity with the square of the distance; a grain of corn in the warm moist earth sprouts into a plant. A congress of nations could not make them do differently.

Man can make things work for him only by finding out just what they do and under what conditions they act. Then he can set to work those which do what he desires done. The farmer must know how seed and soil act; the cook must know how flour and yeast behave; the builder of locomotives must know what steam will do under various conditions; the maker of electrical appliances must understand the behavior of electricity; the debater must know the power of premises to compel conclusions; the man who desires to do his duty must know the effects upon life of various kinds of conduct. In

every line of his activity, man can get the assistance of things only by letting them work for him in their own peculiar ways.

The province of the sciences is to describe and explain in the simplest manner the activities of things considered by themselves, so that we can most easily understand how to make use of these things in attaining our purposes. In the words of Münsterberg,

> If we want to make use of things in the world, we must know what they are in themselves, not only what they mean to us and what they are for our will, but what they are independent of us and our interests. Hence, we must look on the chaos of things with the special aim of finding out what they themselves contribute to our experience and how they hang together without reference to us. To do this, we must consider them as objects, which are cut loose from our will and interest. As soon as we deal with the things of life as if they were nothing but mere objects, they interest us only with reference to their connection. Their relation to us, to our feeling and will, is then ignored and omitted. We call this connection of the things among one another causality.[1]

This simplicity in description and explanation requires (1) that things having the same characteristics be treated, not as individuals, but as a class, so that one descriptive and explanatory statement will do for a number of things; it requires also (2) that this statement be as simple as possible. As the number of things in a class is increased, the control given by one scientific formulation is increased; as the description of the class is made simpler, it is more easily understood. As Karl Pearson says,

> By the formation of conceptions, which may or may not have perceptual equivalents in the sphere of sense-impression, the scientist

[1] Münsterberg, Hugo, *Psychology and the Teacher*, pp. 28–29. (This separation of things from purposes is, however, relative rather than absolute.)

is able to classify and compare phenomena. From their classification he passes to formulae or scientific laws describing their sequences and relationships. *The wider the range of phenomena embraced*, and *the simpler the statement of the law*, the more nearly we consider that he has reached a "fundamental law of nature." The progress of science lies in the continual discovery of more and more comprehensive formulae, by the aid of which we can classify the relationships and sequences of more and more extensive groups of phenomena. The earlier formulae are not necessarily wrong, they are merely replaced by others which *in briefer language describe more facts*.[1]

Again, to use the words of Professor Santayana,

> But the hope of science, a hope which is supported by every success it scores, is that a simpler law than has yet been discovered will be found to connect units subtler than those yet known; and that in these finer terms the universal mechanism may be exhaustively rendered.[2]

Things come usually in the form of bundles; they are composite in nature and complex in activity. Not many composite things can be included as such in the same class for description, because, although they may be similar in some particulars, they usually differ in others; and even if they were included in the same class, the complexity of their activities would make simple description impossible. Sciences must proceed, therefore, in accordance with the fable that sticks may be broken one at a time when they cannot be broken together in a bundle. The sciences can fulfill their mission only when they make the task of description and explanation as easy as possible by separating complex things into the simplest elements and by taking account of these ele-

[1] Pearson, Karl, *The Grammar of Science*, 1911, pp. 96–97. The italics are mine.

[2] Santayana, G., *The Life of Reason — Reason in Science*, p. 33.

ments one at a time. This fact is illustrated by Hobhouse when he says:

> The mind, with all its powers, is incapable of grasping the whole even of the "flower in the crannied wall." It deals with it first under this aspect, and then under that — as a thing of beauty, as suggestive of a Wordsworthian sonnet, as injurious to the structure of the wall, as a *composita*, as consisting mainly of carbon, oxygen, hydrogen, and nitrogen in certain proportions, as decomposing so many cubic feet of carbonic acid per diem under the influence of sunlight. And whichever aspect we like to take we are pretty sure to leave out the rest. The sonnet would be deranged by a thought of the carbonic acid. And yet somehow all these aspects belong to the flower. The whole, which is the real, contains or presents them all and many more. And so we learn our first lesson about thought, that to grasp anything at all we must leave out the greater part of it.[1]

In simplifying material for special study, a science (1) separates things from all feelings of value which one may have for them, (2) separates one aspect from all other aspects of the things it considers, and (3) divides these things, from this special point of view, into the simplest parts, or elements. This process of scientific method is abstraction, a term which comes from the Latin word meaning "to draw away." By abstraction, we take away from a thing in imagination that which cannot be taken away from it in reality. Whiteness, for instance, cannot exist by itself, but always appears as the color of some object; yet we can consider whiteness in imagination as though it had a separate existence.

The ordinary way of examining a complex thing, we have learned, is to take it apart and put it together again. This is the method used by the scientist in dealing with the intricate things in nature just as it is the method used by the child in trying to understand some mechanical

[1] Quoted by J. Welton, *The Logical Bases of Education*, p. 64.

toy. The simplest parts, or elements, are found, and then the ways in which these elements combine are discovered. In chemistry, for example, material things are separated into such elements as oxygen, hydrogen, and carbon, and then the ways in which these elements combine to form the many things in nature are described. Descriptions of how elements go together, of how they act singly and in combination when uniting, form the laws of nature.

(1) In our real world, things are always connected with purposes. We give attention to them when we use them in satisfying our desires. Because of their relation to purposes, things acquire some value recognized immediately through feelings of appreciation. With these values, the sciences are not concerned. The province of the sciences, as we have learned, is to find how things act when taken by themselves, and shuts out at once, therefore, all consideration of how persons may feel about these things. Whenever feelings of value intrude upon a field of science, they become mischief-makers; they create prejudices, confuse the issue, encumber thought. The scientist must be an unprejudiced observer of things; he must see what takes place, but feel no preference whatever for one thing above another. Personally he may prefer fragrant flowers to stinking weeds, and words of wisdom to the babblings of idiocy; but as botanist or psychologist he must be absolutely impartial.[1]

(2) After things have been abstracted from the values we feel for them, they are still very complex. For example, corn, although we may not at the time desire to use it in any way, may be considered as seed, as food, as a commodity to be sold, as a material for making alcohol, as a cargo for a ship, etc. Further abstraction, or analysis

[1] Cf. Münsterberg, Hugo, *Psychology and the Teacher*, p. 30.

in imagination, must be made. Whether one thing appears before or after another, the length of time between them, differences in the sizes and relative positions of things in space, are important considerations affecting causal relations. When such time and space relations are considered by themselves, the problem becomes much simpler than it would be, if the particular natures of things in time and space were considered simultaneously with these relations. Time and space abstracted from all content mark the field of mathematics. Light, heat, sound, and other forms of energy manifested in things, also may be considered by themselves. This abstraction marks the field of physics. Qualitative changes in things which affect their properties as forms of matter, are abstracted for study by the science of chemistry. Changes due to life in organic matter mark another abstract field for study, the field of biology. In grammar and logic, forms of language and of reasoning respectively are abstracted from content, so that investigation will not be encumbered by the particular meanings of sentences and arguments. Each of these fields may, in turn, be subdivided by further abstraction. The field of mathematics may be subdivided into those of arithmetic, algebra, geometry, etc.; the field of physics may be subdivided into those of mechanics, heat, light, sound, and electricity; the field of biology may be subdivided into those of botany and zoölogy.

(3) When all personal preferences have been eliminated and certain aspects of things have been abstracted for investigation, still further analysis is necessary for the sake of simplicity. Sciences seek, therefore, the elements within their respective fields. In the elements, the simplest forms are reached; there is no immediate pos-

sibility of further subdivision. If further subdivision were possible, it would mean that an element has not been found. Thus mathematics seeks axioms; physics, molecules; chemistry, atoms; and grammar, parts of speech. Because the simplest particle of matter that can be seen even with the aid of the most powerful microscope is still divisible, physics and chemistry have been compelled to invent hypothetical molecules and atoms, which have never been seen by anybody and are purely inferential though well established. From the atom, even a smaller unit, the electron, has been separated in the service of certain phases of science.

Scientific analysis not only simplifies objects, but also greatly reduces in number the classes of objects to be described. Elimination of personal preferences does away with many classifications that have no significance for science. A classification of plants on the basis of some investigator's personal preferences for their beauty, odor, or some sentimental value would be useless, because individuals differ in such preferences. Countless objects differing greatly in other respects may have in common some aspects which may be taken together for description. When we have a certain number of characteristics to deal with, the larger the number of characteristics included in each of the various classes for description, the smaller is the number of classes for description. All material things are in time and space, manifest forms of energy, and undergo qualitative changes. Descriptions included in mathematics, physics, and chemistry may, therefore, apply to all of these things and thus reduce the number of classes to be considered. All organic matter may undergo changes due to life, which are described in biology. Language and reasoning have respectively common

characteristics which may be treated by a single science as grammar or logic. Finding the elements still further reduces the number of classes to be described. Twenty-six letters spell all the words of the language; about eighty chemical elements are responsible for all the qualitative differences in material things; nine parts of speech make all the sentences uttered by man.

When elements have been reached, the next step is to find how they behave both separately and in combination. Here their stubbornness is an advantage to the scientist; for they always behave in the same ways under the same conditions. Observation has revealed so many instances of this that the scientist assumes it to be universally true. If there were no such uniformity of nature, if things behaved in capricious ways, descriptions of their behavior at one time would be of no use in setting them to work later. If, under the same conditions, hydrogen and oxygen, when united in the proportion of two volumes to one, might form water or milk; if iron might be attracted to the earth or repelled by the earth; if sound might become more intense or less intense with the distance; if bread might be a food or a poison; if the same argument might force conviction or be absurd; — if, in every instance, nature were not uniform, of what use would descriptions of the behavior of things be? Only when man knows with certainty what they will do can he successfully set them to work for him.

Descriptions of these uniformities in the behavior of things constitute the laws of nature. The laws of nature, accordingly, are not like those of a state, which may or may not be obeyed. Nature needs no policemen or penal institutions to compel obedience. In so far as scientific laws are true, they tell, not what ought to be done, but

what was, is, and will be done, unfailingly, precisely, universally. When things are set to work for man in accordance with true scientific formulæ, they never shirk; they are always reliable.

We must know not only what kind of behavior things manifest, but also how much they accomplish. As Spencer says, "Our first achievement is to foretell the *kind* of phenomena which will occur under specified conditions; our last achievement is to tell not only the kind but the *amount*."[1] A physician must know not only what kind, but also how much medicine must be given to bring about the desired result. Too little may be useless and too much may be injurious. In the application of chemistry to manufacturing, measuring instruments are conspicuous. Even if the desired result is attained when more than the necessary amount of some chemical is used, there is at least a waste of material. Some things are more effective than others, furthermore, in accomplishing the same kind of result. Some filaments in lamps give more light than others with less electricity; some educational methods give greater results than others with less work on the part of both the pupil and the teacher. Measurement is necessary for determining which are more useful. This is obvious in the case of the lamp filament; it is less obvious, but just as true, in the case of educational methods. Only with the use of objective measurement such as that made possible for handwriting, arithmetic, and composition, and by various other methods for measuring mental abilities, can educational practice escape inaccurate opinion and be put on a truly scientific basis. Just as the phenomena of heat could not

[1] Spencer, Herbert, *Essays — Scientific, Political, and Speculative*, Vol. II, pp. 4–5.

be treated scientifically until the thermometer was invented, so the phenomena of education could not be treated scientifically until appropriate methods of objective measurement were invented.

Just as the scientist goes beyond direct observation in finding atoms and molecules as the elements of physical things, so he goes beyond direct observation in finding the laws of nature. In both cases, he gives imaginary descriptions that have been found to work satisfactorily when tested in the light of what he can observe. As hypotheses that are found to work satisfactorily when tested, laws of nature are man-made instruments justified by their usefulness. Pearson says:

> The discovery of some single statement, some brief *formula* from which the whole group of facts is seen to flow, is the work, not of a mere cataloguer, but of the man endowed with creative imagination. The single statement, the brief formula, the few words of which replace in our minds a wide range of relationships between isolated phenomena, is what we term a scientific *law*.[1]

Nobody has ever seen how light is transmitted in space; the laws of light transmission based upon the assumption of ethereal vibration, are inventions made because they are useful in describing and explaining the phenomena of light. Darwin did not see directly the laws of evolution, but invented them through suggestions received from the methods of breeding plants and animals. Yes, laws of nature are just as truly inventions as are mechanical devices used in the industrial world. In both cases, when more effectual ones have been invented, the older ones are cast aside; and, to a reader of the history of science, the scrap heap of antiquated laws appears as conspicuous as the scrap heap of antiquated machines.

[1] *The Grammar of Science*, 1911, Pt. I, p. 31.

II

The sciences recognize two kinds of persistent behavior in things, — that dependent on efficient causation and that dependent on logical cogency. Efficient causation is manifested only in physical things, and is, therefore, peculiar to physical sciences, such as physics, chemistry, and biology. Logical cogency is peculiar to sciences such as logic and mathematics, which deal with pure forms.

In saying that the function of the sciences is to find the "activity" or "behavior" of things taken by themselves, we have attributed to things characteristics of the human will. This common and easier way of regarding things dates back to primitive animism, and, in the light of modern knowledge, is true only metaphorically. Pearson expresses the truth more accurately when he says that a scientific law is "the single statement, the brief formula, the few words of which replace in our minds a wide range of relationships between isolated phenomena." [1]

The sciences recognize two kinds of persistent activity or behavior of things; or, better expressed, two kinds of relationships among phenomena, — that dependent on efficient causation, as when the blow of a hammer causes heat, and that dependent on logical cogency, as when a mathematical proof compels one to accept the conclusion.

[1] A still more significant statement is given by Pearson as follows: "A scientific law is related to the perceptions and conceptions formed by the perceptive and reasoning faculties in man; it is meaningless except in association with these; it is the *résumé* or *brief expression* of the relationships and sequences of certain groups of these perceptions and conceptions, and exists only when formulated by man." (*Opus cit.*, p. 82.) The truth of this statement appears in the light of the fact that the nature of things consists largely of meanings developed by reason and read into sensation symbols. In order to avoid making the discussion of the scientific treatment of things unnecessarily difficult, we have not short-circuited the relation between the sciences and reason by treating things as largely objectified reason.

Physical sciences, such as physics, chemistry, and biology, deal directly with the former; dialectic sciences, such as mathematics and logic, deal directly with the latter.

Although the physical sciences take special abstract points of view, they still deal with material objects, which manifest physical, or efficient, causation. Through physical causation, the heat in the firebox of a locomotive causes the steam pressure in the cylinder; the steam pressure in the cylinder causes the movements of the piston rod; the movements of the piston rod cause the turning of the wheels; the turning of the wheels causes the movement of the locomotive. These changes appear one after another in time. The laws, or formulae, minutely describing them can be derived by a process of induction based on observation of concrete facts. For this reason, there is always the possibility, however, that new facts which appear with more extended observation may invalidate the laws, or formulae, attained through induction.

Scientific abstraction may, however, go so far as to exclude all physical objects and take separately for investigation only the forms in which they appear, such as time and space. Or it may go still one step further to the highest degree of abstraction, which deals with the forms of thought itself. Mathematics, formal grammar, and logic are examples of sciences that do not include material things in their abstract points of view. We have learned that where there are no physical objects, there can be no physical, or efficient, causation. Physical energy cannot be stored in a void, — in absolutely empty time, space, and forms of thought. Yet pure forms are just as stubborn in having their own way as are physical things; relations, as in the case of pure mathematics, are unalterably fixed. Twice eight is sixteen; opposite angles

are equal; and the will of no man can change these relations. However unwelcome a conclusion may be, a person must believe it, if he accepts the premises as true, and if he fully understands the steps in a logically sound argument that leads to the conclusion. The necessary relations in mathematics and logic are due to what is called logical cogency.

Logical cogency is not passed from one thing to another in time as is physical causation. The series of relations pointed out in the several steps of a geometrical proof exist all at once. The steps in the proof are due merely to our attending to one thing after another in time. Similarly in logical argument, the conclusion exists in the meaning of the premises; there is nothing, as in the case of physical causation, passed on from one step to another. The conclusions of sciences which deal with pure forms impress one, moreover, as having universal validity; there is no feeling, as in the case of truths derived inductively in physical sciences, that further observations may invalidate the conclusions. Dialectic sciences have all the evidence in the case; for they are essentially deductive, and their validity does not depend, therefore, upon the observation of particulars, which are infinite in number, but upon premises that are universal and all-sufficient.

The high degree of abstraction involved in dealing with pure, empty forms adds to the difficulty of dialectic sciences. The comparative difficulty in comprehending highly abstract ideas becomes evident whenever we pass from a highly abstract conclusion to a concrete illustration of it.

Physical and dialectic sciences are not, however, entirely separate. Mathematics and logic may be used as "tools"

in developing physical sciences. Indeed, without the assistance of mathematics and logic, practically no progress could be made in the physical sciences.

III

If an individual acquires normal experience of the sciences, the logical classifications involved must be psychological for him. Sciences are merely "a development of that common knowledge acquired by the unaided senses and uncultured reason." Logical and psychological stand opposed to each other only in the case of an individual who, without taking the intermediate steps, jumps from a comparatively crude knowledge of control to the use of highly developed social patterns for control.

In the life process of projecting purposes and realizing them through means of control, the latter are organized with reference to the purposes they serve. A person's pen, ink, paper, blotter, desk, chair, and lamp, are connected through his purpose of writing. His purpose of writing is, in turn, connected with the purpose of putting certain ideas in permanent form for use in teaching; teaching is connected with various purposes, including that of making an income; the income is connected with many ends for which it is spent. Not only are the pen, ink, paper, blotter, etc., connected with one another by these purposes with which they are associated, but they are connected also with all other things that serve the same purposes, — with the schoolroom in which he teaches, its equipment, and pupils; with investments used to increase his income; with home, church, theater, food, clothing, and all other things for which he spends money. Things of his world, no matter how extensive and complex that world may be, are all bound together by his interrelated purposes; nothing can escape such organization. In following these lines of connection,

no break is experienced anywhere. This organization of things has been termed *psychological.* Its bonds are essentially bonds of feeling, because feeling is essential to purpose.

The very first step in scientific procedure dissolves these bonds of feeling; it abstracts things from the purposes they serve, and thus prepares them for classification with reference to what they do by themselves. Just as in a dictionary words are classified not according to the combinations in which men ordinarily use them, but with reference to certain characteristics of the words themselves, *i.e.* their initial letters, so in the sciences things are not classified according to how men use them, but with reference to certain characteristics peculiar to the things themselves. As distinguished from the psychological, such classification is termed *logical.*

Because the sciences are developed in the self-active process, they cannot, however, escape connection with purposes. If a scientific investigator truly understands the significance of his work, it is because he has come to a place in personal development where he feels the need of such investigation for the purpose of more effectual use of things in control. This purpose, which marks the function of sciences, connects their logically organized contents in a normal psychological way with the whole realm of purposes, which unite things of the world so intimately and fluently. Under normal conditions, the logical classification is for this reason also psychological.

If a child who has read only story books undertakes to read a dictionary without understanding the purpose which the dictionary serves, he feels no connection between definitions. Words which in his story books were combined in a meaningful way with no apparent breaks, now

appear disconnected. Sentences which led so fluently one to another, now appear isolated. If he is made to feel, however, the need of what the dictionary does, that it takes the place of a teacher who tells him quickly the meanings of unfamiliar words, and if he is led not only to appreciate the purpose of the dictionary but also to understand how it organizes words alphabetically for his convenience, then the contents of the dictionary become intimately connected with the other things in his world. When he meets a new word in his reading, he may use the dictionary and return to his reading without feeling a break. If he should learn elsewhere the meaning of some word not in his dictionary, he may make the dictionary more useful by inserting the word with its definition at the proper place in the margin. The dictionary arrangement of words which appeared at first so strange, disconnected, and disconcerting, now takes its normal place in his experience. It has become "psychologized" for him.

So it is with the scientific organization of facts. If the individual who has not felt the need of scientific analysis and classification is led abruptly into the realm of the sciences, things appear strange, disconnected, disconcerting. The contents of the sciences do not appear in the natural relations of things in his daily life with its bonds of feeling. The several sciences appear cut off by themselves; they "fractionalize" his world. Between physics and grammar, botany and arithmetic, there seems to be no connection. Even within one science, groups of facts appear isolated. In grammar, the various parts of speech are grouped separately; in physiology, bones, muscles, and other parts of the body are similarly isolated; in physics, the facts of mechanics, heat, light, sound, and

electricity are kept apart one from another. He has never before met facts classified and pigeonholed in this way. The logical classification appears to him as something quite different from the normal, or psychological, one. But when the individual, in passing from the logical to the psychological classification, has been led to appreciate the purpose of the sciences and to understand the method by which they give better control over the activities of his daily life, this break between the logical and the psychological classifications disappears. Sciences take their normal place in his world, which is interrelated by bonds of purpose. The logical method of the sciences has now become psychological for him.

Unless a science does thus become psychological for the individual, it cannot, indeed, be logical for him; because the true significance of the groupings of facts depends upon the purpose for which these groupings were made and are used. In a word, the individual to whom a science is not psychological misses the logic of its classifications, and, therefore, misses everything that makes it science.

When we view the sciences from the wider perspective of their social development, the psychological and logical organizations of things do not appear incongruous. They stand opposed to each other only in the experience of some individual who, without taking the intermediate steps, jumps from a comparatively crude experience of control to the use of social patterns for highly developed experience, as in the case of a pupil who with a meagre knowledge of natural phenomena begins the study of a logically organized textbook in chemistry. The omission of these intermediate steps makes the break appear between the psychological and logical. The advanced

patterns do not have an appropriate basis in his experience, and give, therefore, abnormal results.

The sciences, to use the words of Spencer, are "a development of that common knowledge acquired by the unaided senses and uncultured reason."[1] They arose historically when practical difficulties made men feel the need of better control. When the Nile overflowed its banks and washed away landmarks, geometry was devised for the practical purpose of redistributing the land. To regulate the dates of religious festivals and to fix times for agricultural operations, astronomy was devised. As Spencer says, "How to fix the religious festivals; when to sow; how to weigh commodities; in what manner to measure ground; were purely practical questions out of which arose astronomy, mechanics, geometry."[2] Scientific method is not something externally imposed upon the mind to guide its investigations, but merely a recognition of the necessary ways in which the mind works in developing means of control. When these ways are known, they can be followed deliberately, thus giving the best results with the least expenditure of thought. There is no break, therefore, in going from the uncultured to the cultured reason. Nor is there a break in going from the unaided to the aided senses. Seeing with a telescope and microscope is not essentially different from seeing with the naked eye. The only difference is one of distinctness and minuteness of vision. In primitive times, aids to the senses appeared in such variable standards of measurement as the length of a man's foot, arm, or step, the width of his hand, the breadth of grains of barley, the weight of grains of wheat, the length of a day, and the

[1] Spencer, Herbert, *Essays — Scientific, Political, and Speculative*, Vol. II, p. 29.

[2] Spencer, Herbert, *opus cit.*, p. 69.

duration of the cycle of the moon's changes. They have developed until, according to Marmery, "we can now perceive the 9,000th part of a degree in temperature, 1,000,000th of a second in time, 1,000,000th of an inch in space, 1,000,000th of a gramme in weight, the presence of the 10,000,000th part of a gramme of a substance. We can in fact observe 'quantities 300,000 or 400,000 times as small as in the time of the Egyptians.'" [1]

IV

Social division of labor has rightly provided workers in the pure sciences who are not concerned with applying the results of their investigations to practical affairs. The pure sciences are, however, only intermediate steps in the social development of control, and are supplemented by applied sciences such as those of engineering, medicine, and education.

Although sciences arose in overcoming difficulties in the practical life and are the outgrowth of common experience, they could not be developed by one man or by one generation of men. They are the slow and difficult product of centuries of investigation. Aristotle and Bacon, who lived two thousand years apart, both contributed to the development of scientific method. In the social division of labor, it was natural for men specially gifted in scientific research to devote their lives to such work. The developing of the sciences has thus become the task of a special class of men who are not concerned with applying the results of their investigations to practical affairs, but serve their function in the social order by merely finding and recording the laws of nature. They are limited in this way to pure sciences.

[1] Marmery, J. V., *The Progress of Science*, p. 268.

Pure sciences are, however, only an intermediate stage in the social development of control. The purpose which normally calls them into being is not fulfilled until they are put in the service of the practical life. They are put in the service of the practical life by the so-called applied sciences, the workers in which must understand not only truths established by pure sciences but also the practical activities in which these truths may be useful.

The conclusions of the pure sciences, like blossoms on a tree, do not all bear fruit. Applied sciences must select those which prove to be useful, and organize them for practical ends. Medical science includes useful results of such pure sciences as anatomy, physiology, biology, and chemistry; agricultural science includes useful results of such pure sciences as botany, zoölogy, geology, and chemistry; engineering sciences involve useful conclusions of various branches of mathematics, physics, and chemistry. In education, truths that give practical guidance are taken from psychology, sociology, logic, ethics, and other fields. The function of applied sciences is thus to turn pure sciences to service in the practical life, in which they originated.

In view of the fact that the ultimate purpose of sciences is practical, should not all investigators have in view the practical uses to which their conclusions may be put? Would not this prevent waste of time with trifling matters and definitely guide investigations in the most useful directions? However important may be the scientific results attained by men working with direct practical purposes, it would be a distinct social loss to have all investigations conducted under such conditions. At best, the practical investigator can have in mind only comparatively few uses for testing the importance of

the truths he finds. He would be liable, therefore, to neglect facts which other men might recognize as very useful. The pure scientist, who has no interest in the practical application of the truths he finds, records all his results, so that all men, whatever may be their practical interests, can apply what appears to be useful to them. Matters which may seem to be objects of mere idle curiosity may, furthermore, under the impartial investigations of the pure scientist, develop into truths of far-reaching importance. As Thomson says:

> The twitching of the legs of Galvani's frogs was studied as a theoretical curiosity; who could have foretold that it pointed to telegraphy? . . . Dr. A. E. Shipley has recently called attention to two diagrammatic illustrations of our theme. "A few years ago no knowledge could seem more useless to the practical man, no research more futile than that which sought to distinguish between one species of gnat or tick and another; yet that knowledge has rendered it possible to open up Africa and to cut the Panama Canal." "This witness," Mr. F. A. Dixey remarks, "is true; and it would be difficult to point to a more complete demonstration of the fact that natural knowledge pursued for its own sake, without any direct view to future utility, will often lead to results of the most unexpected kind and of the very highest practical importance." (*Nature*, Sept. 2, 1909.)[1]

V

The normal path leading an individual from unscientific experience to a genuine understanding of the pure sciences, begins with the application of scientific truths to practical affairs, and passes on through difficulties which can be overcome only by scientific methods.

Pure and applied sciences have developed hand in hand. The earliest scientific investigations were in the interest of practical affairs, and, although a place was

[1] Thomson, J. Arthur, *Introduction to Science*, pp. 240, 243–244.

made later for pure scientists in the social division of labor, men have been ever ready to make practical applications of truths established. This wider view reveals the normal pathway over which individuals may pass from common experience to the highly organized experience represented by pure sciences. The individual must understand the function of pure sciences, we have found, in order that he may profit by their guidance. Only thus can the logical organization of subject matter be psychological for him, and, therefore, genuinely meaningful. The function of the pure sciences easily appears to him when he approaches them through the application of scientific truths to practical affairs. How to make a fire, to ventilate a room, to repair an electric bell, to avoid diseases, to perform various agricultural operations, to detect adulterations in foods and textiles, — these few random problems indicate some of the many points of contact which the sciences, if approached from the practical side, may be found to have with common experience. In the study of such practical problems one eventually meets difficulties which can be overcome only by the use of scientific methods. When the individual has reached this stage in his experience, the step to pure sciences is interesting, significant, and easy.

Some school courses intended to give a general introduction to the more fundamental sciences have made the mistake of centering discussion about common things such as air, fire, water, earth, rather than about activities such as those mentioned above. This method has three serious disadvantages. (1) It does not call forth strong practical motives, but puts the burden of interest upon mere curiosity. (2) It provides no criterion, such as importance in use, by which the more important facts

may be selected for presentation. (3) It lacks not only the psychological organization in which facts are arranged in the order needed to guide some practical activity, but lacks also the logical organization which groups facts, not according to their relations to particular things, but according to relations existing among the facts themselves. At the same time, this method does nothing to lessen the break between the facts of one field of science and those of another.

There is a mistaken belief that mere curiosity may lead the individual directly into the realm of pure sciences. The satisfaction of curiosity, which is possessed by primitive man and even by lower animals, is no guarantee of scientific experience. Only when man's curiosity has been disciplined by experience of the need of pure sciences and by a knowledge of their method, does it become a truly scientific motive.

VI

The only unity in the sciences is unity of method. As investigators mark more definitely their respective fields and reveal thereby the relations between their own and other nearly related fields, the classification of the sciences will slowly develop. Since things studied by the scientist ever become more complex, because of new meanings read into them, there will always be scientific developments so new and ill-defined as to elude classification.

Classification of the various sciences is a task so difficult that it has not been successfully done, although master minds have attempted it. As sciences develop, the relations among the more fundamental ones become better defined, but, at the same time, the task of classification becomes more difficult, because new fields of investigation more or less elusive of classification are opened.

The only unity of the sciences, as in the case of the fine arts, is unity of method. We have found that the fine arts differ one from another, because, although they follow the same general method, this method must be adapted to the different kinds of material used. Every science abstracts things from values, limits itself to some abstract phase of these things, analyzes its material into elements, and finds how these elements combine. The second abstraction, which limits each science to one aspect of the things considered, differentiates the various sciences by marking their special fields of investigation. If a science deals with material things, it can use efficient causation in its explanations; if its field is that of time, space, or forms of thought abstracted from content, it must use logical cogency in its explanations. If the material is amenable to accurate measurement, the science is exact; if the material is amenable to only inexact measurement, the science is inexact.

Since the sciences differ because the fields to which they apply the same general method differ, the logical classification of the sciences depends upon the relation of these fields one to another. Comte imagined these fields arranged as a flight of steps, each step resting upon the one below it and supporting the one above it in what is termed a hierarchy. Recognizing six fundamental sciences, he arranged them in the following order: mathematics, astronomy, physics, chemistry, biology, and sociology. These six steps, according to Comte, lead to another above them, which is the science of morals. He supports this organization by the argument that both in the order of the parts of a particular science and in the order of the whole body of sciences, there is a progress from that which is more general to that which is less

general. He claims also that this is the order in which these sciences originated historically. Comte is mistaken with regard to both the logic and history of the development of the sciences. A sufficient test of his conclusions, without our going into a detailed consideration of them, is the obvious fact that mathematics is not related to sociology merely through the intervening steps of astronomy, physics, chemistry, and biology. Mathematics is not applied to physics merely through astronomy, nor is physics applied to biology merely through chemistry. In making hypotheses to be tested, each science has taken advantage of analogies with sciences below it in the order named; but it is by no means limited exclusively to such analogies.

In representing the relations of the sciences, a better analogy than the staircase is the tree. The latter, which appears in the common expression " branches " of science, is an idea of long standing. There are two main branches of the trunk, one representing the sciences that deal with forms only, and the other representing sciences that deal with material things. The former main division has two large branches, that of mathematics, which deals with the forms of time and space, and that of logic, which deals with the forms of reasoning. The latter main division has as its two largest branches the physical and the biological sciences. Out of the physical sciences come physics and chemistry, and out of the biological sciences come botany and zoölogy. Physics branches into mechanics, sound, heat, light, electricity, and so on.

Although the analogy of the tree has a number of points in its favor, it is not true in all respects. As Spencer says:

> It suggests the facts that the sciences had a common origin; that they have been developing simultaneously; and that they have

been from time to time dividing and sub-dividing. But it fails to suggest the fact, that the divisions and sub-divisions thus arising do not remain separate, but now and again re-unite in direct and indirect ways. They inosculate; they severally send off and receive connecting growths; and the intercommunion has been ever becoming more frequent, more intricate, more widely ramified.[1]

The use of mathematics and logic in the development of other sciences is a conspicuous example of this complication.

As the tree of scientific knowledge grows, however, the more fully developed branches become more definitely marked in their relations one to another. This appears in the relations of the sciences traced above. As we come to the newer growths, the relations are more and more obscure. This is because newer sciences are comparatively undeveloped, more or less changing in nature, and often deal with fields that overlap. This last is sometimes seen in the overlapping of advanced science courses in university work.

As one mind cannot comprehend all the sciences, organization is possible only through the coöperation of scientists. As investigators mark more and more definitely the limits of their respective fields, and reveal the relations between their own and other nearly related fields, the classification of the sciences slowly develops. This classification will always be far behind the newer scientific developments; it can never overtake all sciences. The chief reason for this is that as new meanings are found for things and read into them, these things offer new abstract aspects for study. This marks the essential truth of Pearson's statement:

[1] Spencer, Herbert, *Essays — Scientific, Political, and Speculative*, Vol. II, pp. 28–29.

Every great advance of science opens our eyes to facts which we had failed before to observe, and makes new demands on our powers of interpretation. This extension of the material of science into regions where our great-grandfathers could see nothing at all, or where they would have declared human knowledge impossible, is one of the most remarkable features of modern progress. Where they interpreted the motion of the planets of our own system, we discuss the chemical constitution of stars, many of which did not exist for them, for their telescopes could not reach them. Where they discovered the circulation of the blood, we see the physical conflict of living poisons within the blood, whose battles would have been absurdities for them. Where they found void and probably demonstrated to their own satisfaction that there was void, we conceive great systems in rapid motion capable of carrying energy through brick walls as light passes through glass. Great as the advance of scientific knowledge has been, it has not been greater than the growth of the material to be dealt with. The goal of science is clear — it is nothing short of the complete interpretation of the universe. But the goal is an ideal one — it marks the *direction* in which we move and strive, but never a stage we shall actually reach. The universe grows ever larger as we learn to understand more of our own corner of it.[1]

VII

The belief that the sciences give insight into the essential nature, or reality, of things, and the belief that they give materialistic conceptions of life that necessarily conflict with idealism, are erroneous.

Two erroneous ideas of the nature of the sciences are so widely prevalent as to justify our discussing them here. One is that the sciences lift the veil from nature, give an immediate insight into the reality of things, and therefore reveal the absolute truth. The other idea is that the sciences restrict us to sordid materialistic conceptions of life which necessarily conflict with idealism, that they con-

[1] Pearson, Karl, *The Grammar of Science*, 1911, Pt. I, p. 14.

tradict the moral freedom of the will, point to only "worldly" success, and deny the immortality of the soul.

The sciences do not give insight into the reality of things. They deal with all sorts of hypothetical assumptions that are not known directly and that are justified only because they serve as guides in control. No one ever saw atoms, molecules, and ethereal vibrations. Such conceptions are accepted by the scientist as true because they are the conceptions that best guide him in the use of things. Other conceptions might give better control. If these are invented, the less effective ones will be laid aside and the new will take their places. Old scientific conceptions have been replaced by new ones over and over again.

The laws of nature, furthermore, as formulated by the sciences, are man-made inventions in the interest of control. This fact is expressed by Pearson as follows:

> Let it be noted that in this it is not only the process of reaching scientific law which is mental, but that the law itself when reached involves an association of natural facts or phenomena with mental conceptions, lying quite outside the particular field of those phenomena. Without the mental conceptions the law could not be, and it only comes into existence when these mental conceptions are first associated with the phenomena. The law of gravitation is not so much the discovery by Newton of a rule guiding the motion of the planets as his invention of a method of briefly describing the sequences of sense-impressions, which we term planetary motion. He did this in terms of a purely mental conception, namely, mutual acceleration. Newton first brought the idea of mutual acceleration of a certain type into association with a certain range of phenomena, and was thus enabled to state a formula, which, by what we may term mental shorthand, resumes a vast number of observed sequences. The statement of this formula was not so much the discovery as the *creation* of the law of gravitation. We are thus to understand by a law of science, *i.e.* by a "law of nature," a *résumé* in mental shorthand, which replaces

for us a lengthy description of the sequences among our sense-impressions. Law in the scientific sense is thus essentially a product of the human mind and has no meaning apart from man. It owes its existence to the creative power of his intellect. There is more meaning in the statement that man gives laws to Nature than in its converse that Nature gives laws to man. . . . The reason we find in natural phenomena is surely put there by the only reason of which we have any experience, namely, the human reason. The mind of man in the process of classifying phenomena and formulating natural law introduces the element of reason into nature, and the logic man finds in the universe is but the reflection of his own reasoning faculty.[1]

A person who has acquired scientific meanings reads them into the things of his world, just as we have found he reads other meanings into these things.[2] The hot radiator appears to the student of physics as having accelerated molecular vibrations, and falling objects seem to him to obey a law that can be expressed with definite mathematical formulae. The student of chemistry sees in common salt a combination of sodium and chlorine, and fire appears to be due to the uniting of an inflammable and an inflaming gas. In plants and animals about him, the student of biology reads the meanings of cell life, evolution, and heredity which science has taught him. The further his study goes, the more reason he seems to find in the world, but he finds it there because he has first developed it himself and has then read it into the things about him; he does not get his scientific truth through a direct insight into the real nature of things.

That the sciences necessarily conflict with idealism and restrict us to sordid materialistic conceptions of life is another erroneous belief. The most conspicuous example of this error is found in the belief that the bio-

[1] Pearson, Karl, *The Grammar of Science*, 1911, Pt. I, pp. 86–87, 91.
[2] See p. 120.

logical sciences, in describing and explaining materialistically the nature of life, have final authority to deny the moral freedom of the will, the existence of God, and the immortality of the soul. When the biological sciences are regarded as techniques invented by man to control nature for the sake of realizing his ideals, it becomes clearly evident that these ideals in the last analysis lie beyond the realm of the biological sciences, which can neither prove nor disprove their value. In the last analysis the sciences are the servants of ideals, not the masters; they have neither meaning nor value apart from the purposes which they serve.[1]

VIII

The analogy in function between the brain and a switchboard has implications supporting the teleological views given above with regard to the essential characteristics of the sciences, the relations between the psychological and the logical organizations of subject matter, and the erroneous beliefs that the sciences reveal the essential natures of things and give conceptions of life that authoritatively conflict with idealism.

Let us next find how natural science explains the nature of the sciences. From the materialistic point of view, the sciences are patterns for organizing the automatic "switchboard" of the brain in a way that simplifies and makes more effective the overcoming of obstructions in the reaction of the organism to the environment. We are concerned with the general nature of the changes that the sciences, acquired as a social inheritance, make in the brain of the organism. In explaining these changes we are limited to analogical reasoning based upon the similarity in function between a switchboard and the brain. In the switchboard, the interconnections are channels

[1] See pp. 17–18.

for electricity; in the brain, they are channels for nerve force. The explanations which follow are, of course, merely plausible implications based upon this analogy.

When, in the adjustment of the organism to the environment, the fundamental brain channels, involving those which are inborn, or instinctive, are checked in functioning, acquired channels of response which conduct nerve energy in ways that overcome these checks are connected with these fundamental channels. In other words, new reactions are formed in the process of overcoming the checks in the functioning of old habits. Let those channels which are essentially instinctive be called *primary*, and let those which are acquired in overcoming the checks in the functioning of these primary channels be called *secondary*. The function of the sciences is to organize the secondary channels for effective adjustment.[1]

Since the changes in the brain in the process of organization under the influence of the sciences take place in the secondary channels, the function of which is merely to overcome checks in the primary channels, the individual in the study of the sciences is conscious of dealing only with means of control. If feelings of value appear, this scientific organization is perverted and therefore less effective, because the feelings of value would indicate that primary channels, in relation to which the feelings of value originate, are influencing the organization so as to give to some secondary channels stronger places in the organization than their use in overcoming checks would require, and that other useful channels are given relatively weaker places, with the result that the greatest efficiency is not secured. This interference by primary channels would take place if, for example, the botanist

[1] Cf. pp. 194–195.

because of instinctive preference would study fragrant flowers and neglect offensive weeds, knowledge concerning which is very useful in the field of botany. Accordingly, the fact that the sciences organize only the secondary channels in the brain in ways that make control most effective, means on the side of consciousness that the values felt for things are disregarded when these things are considered from the strictly scientific point of view.

The responses necessary to overcome checks in reactions to the same thing in the environment may be various. In opening the way for some particular system of habits to function, it may be necessary that a quantity of corn, for example, be changed to a different place, lifted against the force of gravity, used in making alcohol, or planted. These various reactions represent the points of view from which various sciences regard the object. The consideration of relative position falls within the province of mathematics; the investigation of the manifestations of gravity belongs to physics; the study of the process of making alcohol belongs to chemistry; and the phenomena of growing corn belong to biology. The isolation of each of the various classes of responses is obviously an essential step towards the effective reorganization of the responses in each class.

The next essential step in the organization of secondary channels of response is the reducing of them to their simplest forms. This step reduces the number of the kinds of responses, because a few simple reactions may be united in many combinations which as wholes are very different one from another. Since ideas of the meanings of things parallel the reactions with regard to them, this analysis of responses into their simplest forms corresponds to the analysis of things into their elements.

When the simplest forms of secondary channels for reaction have been isolated, the next essential step in the economical reorganization of responses is combining these simple forms in effective connections. Since reactions correspond to meanings, the economical organization of the simple channels for reaction into useful combinations corresponds to the consciousness of the ways in which elements combine; or, in other words, it corresponds to the formulation of the laws of nature.

In normal development, the brain changes gradually from a less to a more organized condition; there are no breaks. Because ideas are the parallels of these brain changes, this truth is the materialistic way of explaining the fact that there is no break between the psychological and the logical classification of phenomena, if the logical classification develops in a normal way. This truth means also that the natural pathway to scientific investigation originates in the use of things for definite practical ends, since the organization of secondary channels for response is an outgrowth of the process of the adjustment of the organism to the environment, in which process both primary and secondary channels are involved.

The fact that the sciences do not give insight into the real nature of things is supported by natural science, because natural science holds that the meanings of the things with which the sciences deal are parallels of the brain changes due to the *responses to stimuli* and not to *direct impressions* of outer realities upon the brain.

Since the sciences organize only the secondary channels of response, and since, as we have learned, the experience of ultimate values is relative to the primary channels, the sciences have no authority to contradict the worth

felt for those ultimate ideals which give, in the last analysis, significance and value to human life.

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PROBLEMS

1. Which is more reliable in determining the methods that should be used in education, science or common sense? Explain.

2. Why is it that the best books in literature are in many cases the oldest, whereas the best books in science are, comparatively speaking, the newest?

3. *a.* Give some instance in your school work in which you experienced a break between the psychological and the logical classi-

fication of subject matter. *b.* In this instance was the logical organization of the subject matter truly logical for you? Explain.

4. What in your judgment are the advantages, if any, of giving in the high school a course in general science introductory to the work in the special science courses?

5. In what important ways do you believe that the science courses you completed in the high school could have been improved?

6. Criticize Herbert Spencer's essay entitled *What Knowledge is of Most Worth?* (Spencer's *Education*, Ch. I.)

7. Do you believe in the moral freedom of the will, despite the conclusions of natural science with regard to this matter? Give the reasons for your answer.

CHAPTER X

SOCIAL DEVELOPMENT

Social development means the increased effectiveness of institutions, which are organized in the service of the fundamental values of life. It requires greater division of labor and greater interdependence of men. Under varying conditions, social development may be gradual, arrested, or revolutionary. The fine arts, history, and the sciences promote gradual development, which is normal. As society advances from the state of nature to that of culture, man is guided to greater personal freedom.

I

The purpose of this chapter is to find more definitely the nature of social development. To simplify the problem, social activities may be classified as those of the industries, the home, the school, the state, and the church. Each of these institutions serves some fundamental human value.

The history of civilization reveals a long process of social development. Each generation not only inherits from earlier generations accumulated patterns for purposes and means of control, but in turn acts vicariously by adding to this inheritance and passing on to succeeding generations still richer values and easier ways for attaining them. Machinery has thus replaced handwork; democracy has replaced monarchy; the law of justice and mercy has followed the reign of arbitrary might and revenge. It is true that this improvement is made by individuals, for they are the media through which society works; but what these individuals do, depends upon their

places in a social order. They contribute to a continuous social development, the history of which can be traced irrespective of any particular individuals who participated in it. One complete step in social advance may be the result of a long period of coöperative work; generations may come and go between the origin and the solution of a social problem. In the Middle Ages, men toiled in building a great cathedral which could not be completed until long after they were dead; they toiled for the benefit of succeeding generations, with no hope of seeing the magnificent mural decorations of the completed edifice, of hearing the sublime music of its mighty organ, of feeling the inspiration of worship before its altar. So it is in the building of civilization. From the very foundation, the life-works of countless thousands of human beings lie buried in its stone and mortar. What they did depended upon what had been done before they came on the scene of action, and had a significance far beyond their particular lives. To find more definitely the nature of this social development to which they contributed is the problem of this chapter.

To simplify the problem, social life may be analyzed into institutions. An institution is a complex group of activities developed in the service of some fundamental purpose the realizing of which is necessary for human welfare. Human welfare requires (1) that men be provided with food, clothing, and other necessities of life; (2) that the race be continued by the rearing of offspring; (3) that these offspring be given purposes and means of control necessary to enable them to take their places in social life; (4) that opportunities for doing things necessary for human welfare be safeguarded; and (5) that men be induced to turn from misleading and capricious selfish

desires and strive continuously for that which is most worth while for humanity. In the service of these fundamental purposes, five great institutions have been developed, — the industries, the home, the school, the state, and the church. These institutions are so closely interrelated that they can be separated only as different aspects of social life rather than as divisions of it. Their effectiveness marks the stage of civilization attained by man; the history of human progress is the history of the remaking of these institutions so that they more effectively realize the purposes in the service of which they were established.

(1) The necessity of the industries to the life of man is obvious; he must eat his daily bread and be sheltered in order to live. Elaborate systems of production, exchange, and distribution, which command by far the greater part of man's energy, are everywhere evident in modern society.

(2) The home is necessary, because children are born helpless and must pass through a long period of infancy before they are ready to take up the responsibilities of mature life. The permanence of marriage and the consequent stability of the home are due primarily to the long period of infancy during which children need the protection and care of parents.

(3) When social life became complex, the school was developed out of the home for the purpose of supplementing the home in giving individuals, during the period of infancy, the preparation necessary for meeting the increasingly difficult demands of civilization. The function of the school is to supplement other educational agencies in giving the individual that experience which is necessary to make him socially efficient.

(4) The state is primarily for the sake of securing justice. Society must protect man in fulfilling the duties which human welfare requires of him. The fact that he has duties means that he has rights necessary for performing these duties. The state should protect the individual when forces, either within or without the social group, encroach upon his rights. Democracy, which gives each mature responsible person voice in defining and protecting his rights, the division of powers of government, and many other safeguards to secure the honest and fair making and enforcement of law, are all in the interest of the main purpose of the state.

(5) The function of the church is to promote righteousness. It develops and keeps alive in men an active appreciation of the final, all-inclusive purpose which gives the deepest significance and value to human life. If this purpose is attributed to a personal God, the essential of the religious attitude is "Thy will be done." When a person feels himself a co-worker with God in realizing the purpose of life, the common virtues, upon which he must depend for guidance in doing this, receive a deeper significance and stronger sanction than the immediate ends which they serve can give to them. Religion thus tends to keep man in the straight and narrow way that leads to the highest welfare.

The church, as other institutions, has a basis in human nature. Various values which men in common feel, such as the value of life itself, of love, of justice, and of truth, point onward to worths greater than those which can be realized in the temporal world. Is life, which we prize so highly, no more than a feverish struggle for existence between the cradle and the grave? Is it "a tale told by an idiot, full of sound and fury, signifying nothing"? Is our love

to be mocked by the annihilating power of death? What is the significance of our sense of justice, if all ends with this world, where the sun shines and the rain falls equally upon the just and the unjust? And has our desire to know ultimate truth no meaning? Shadows of weariness, of discouragement, and of dissatisfaction over partial achievement which darken our pathway, — are they not to be dispelled by a light from afar that gives hope of the final realization of that which the temporal life compels us to seek, but does not let us find? Values deeply implanted in our nature cry out for justification, and their justification points us to God and immortality. Religion is, therefore, at its foundation a matter of feeling, a matter of faith, because it rests upon the implications of values the authority of which is known only by being felt. Although some particular form of religion may be accepted as a special divine revelation to man, its strongest authority is the satisfaction it gives to felt needs of the human soul.

When religious faith has been established, it returns to the practical life to sanction the common things that are worth while. By placing in an eternal order the humblest acts that contribute to the good of man, such as those of our daily work in the home, the factory, and the school, it makes these acts divinely significant. Since the common virtues are guides in realizing the final purpose of life as it appears in religious faith, and since the thought is father to the act, this final purpose commands, "Whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report; if there be any virtue, if there be any praise, think on these things." The value of religion is made out of the funded values of human ideals that fail of real-

ization in the temporal life; religion then gives the whole of this funded value as a sanction to strengthen each worthy human purpose, and thereby promotes human welfare.

We have now pointed out the principal organized means which society has developed for realizing the fundamental human purposes. The industries provide the necessities for life; the home nurtures children; the school supplements other educational agencies in preparing youths for the responsibilities of maturity; the state protects men in their rights so that they may adequately perform their duties; the church keeps alive in men's experience those values which must be sought in attaining the highest welfare.

II

Since the practices included in an institution are ways of overcoming the difficulties in realising the purpose served by the institution, changes which make the realising of this purpose more effective constitute improvement. This improvement requires greater division of labor and greater interdependence of men. As institutions are all members one of another, they develop with relation one to another.

Institutional practices are the ways of overcoming difficulties in realizing the purposes which the institutions serve. Since difficulties give rise to problems the solutions of which are ways of overcoming these difficulties, institutional practices, as noted in the discussion of history, are the solutions of problems. The institutional life of primitive man was simple, because his problems were simple. When fire was used to make tools and agriculture turned men from nomadic life to settled abodes, problems began to multiply rapidly, and the solutions of these problems made the institutional life more complex.

In the industries, men had to solve the problems of how to work the fields with advantage, how to make implements, how to construct storehouses, dwellings, and the necessary furnishings. New relations resulting from life in settled communities presented new problems of government. Several illustrations selected at random from modern times will make this matter clearer. The educational practices of the Jesuits were careful solutions of the problems that arose out of the religious situation when this order began the counter-reformation. One difficulty was to prevent heretical teachings at a time of unstable religious beliefs. The answer to this problem included, among other things, an elaborately devised *ratio studiorum* showing definitely what should be taught, a thorough preparation of teachers in the Roman Catholic faith, careful plans for the selection of officers and instructors, and a direct inspection of classroom teaching. When the emphasis upon drill and the frequent reviews required in the Jesuit schools were found to dull the interest of the students, one way devised to overcome this difficulty was a system of rivalry. Again, the growth of the modern state systems of education in Europe and America has not been capricious and haphazard. The development of industrialism and democratic government, for the most part, presented new educational problems in answer to which changes were made from time to time in educational practices. The systems of education in the several countries developed along different lines, because the social situations and the resulting problems or the means available for solving them were not the same. A nation, such as Germany, for example, which recognized distinct social classes had to devise a corresponding system of education differing from that of a nation, such as the

United States, which does not recognize these classes. School practices already firmly established by tradition, the educational influence of the church, the form of government, — these and many other considerations modify both educational problems and their solutions, and thus modify educational practices. In the state as an institution, to give a further illustration, democratic government is a solution of the problem of how to prevent injustice on the part of privileged classes; the direct primary is one detail in the solution of the problem of how to secure a true expression of the will of the people.

Since an institution is a means serving some fundamental purpose, changes which make it serve this purpose more effectively constitute the development of the institution. The general nature of this development and its far-reaching social effects may be illustrated by Marmery's account of the progressive changes made in the method of preparing corn for food, which constitute one phase of industrial development.

Men at an early stage of social life have no other means of preparing corn for food, beyond boiling it, than by manual labour. Corn is spread on a flat or a hollowed stone, and then crushed by hammering at it with another stone. Each family prepares corn in this way for its own consumption, and the work, whether it be done by the head of the family or his wife or children, is slow and roughly done; the flour resulting from the crushing is coarse and scarcely fit for kneading into dough. A time comes when a savage of genius conceives the idea of grinding corn between two heavy flat stones, the upper of which is moved backward and forward or in a circular manner by one or several hands. This manipulation gives finer flour than before and does so in less time too. A double benefit is at once effected; the corn-grinder has obviously saved time, and provided better and more digestible food. The process spreads quickly among the community and a rise of material welfare ensues, for those who feed on the improved nourishment are more healthy and stronger, so that they

can accomplish their work more efficiently, and the time spared by the new system can be spent in the pursuit of other kinds of work, whether it be hunting game for food, or tilling the soil for any purpose, or weaving, or implement-making. Time comes when the two grinding-stones are replaced by a handmill. The inventor of this machine is a greater benefactor than the first; the upper stone is now moved round and round rapidly by one hand; the work is far more satisfactory than by the previous process; for, as one person is sufficient to grind corn for the whole tribe, the other members of the tribe are relieved from the necessity of grinding for themselves, and can, undisturbed, attend to various occupations. The benefit is not limited to this; with the new appliance there also arises a new state of things: the corn-grinder is paid in kind for his labour, and if the tribe be a numerous one, he has to hire assistants in order to carry out the whole work; and thence there come to be two orders of men, the master and the workmen. The latter have secured a means of existence; they can marry and bring up a family with their earnings, be the wages what they may — corn, fruit, garden produce, game, or garments. Later, say during the Egyptian or the Roman period, the water-mill is invented — an improvement by which numerous benefits are secured: 1, hand-labour is now replaced by machinery; 2, a natural force, water, becomes man's servant, and saves the employment of a score of hands; that is, it has economized or, more properly, multiplied labour; 3, the miller making flour for the whole district now becomes a trader; he buys corn from the grower, thereby benefiting the tiller of the soil, who gets a return for his labour sufficient to keep himself and his family, and to pay working hands; 4, the miller also sells his flour to the bakers, who obtain it from him at a lower rate than if they had to grind their own corn; 5, the consumer buys ready-made bread at a moderate price, since the machinery used has reduced the first cost by saving wages to the miller, and certainly far cheaper than if he had to leave off his own pursuit, say, weaving, for a whole day in order to procure corn, grind it himself, make and bake his loaves. The consumer would lose work, wages, and eat dearer and worse bread into the bargain. 6, The consumer has a family, and the whole family benefits by the invention of the water-mill; 7, the miller, saving hand-labour as he does, nevertheless employs as many or more men than before the new invention, no longer as corn-grinding hands, but as porters, drivers, buyers, sellers, travellers; 8, the trade thus extended necessitates the making of sacks, hence weavers have

more work and more food; the making of carts, hence wheelwrights, if they do not exist already, are brought into existence; smiths have more to do; harness-makers have more work, and in their turn increase the leather trade; this promotes cattle-breeding, and the landowner finds a new source of profit in the improved industry. 9, But the general distribution of benefits does not stop there; the water-mill has to be built, and its construction gives work, hence wages and food, to a crowd of people: labourers to excavate the soil for the foundation; wood-cutters to fell trees; carpenters to prepare and fit the timbers; smiths to make cog-wheels, tires, bolts, nails; mill-stone quarriers and mill-stone cutters; tool-makers to provide implements for all these; brick-makers, brick-layers, tile-makers, and tilers; an architect or clever artisan to plan, direct, and supervise the building. The new invention thus does good to the whole community, for the general increase of prosperity, on account of the greater purchasing power of the people, improves the clothing and building trades — in fact, everything. And not material good only has been brought about, but moral good also. Work being easily obtainable, men who, from want, might have been driven into violence and crime, respectably bring up a family, use their natural abilities to improve their social condition, live orderly lives, and benefit the country. Some will even spend their leisure time in mental and mechanical work which may be fruitful of ulterior benefits to all. One thing is clear: crime has decreased, order and discipline have become a habit, peace has become dear — that is, relatively speaking. And when it is remembered that the new process of milling finds a ready acceptance everywhere, that water-mills are constructed wherever a water stream is available for the purpose, it is easy to see how immensely beneficial it is to mankind, and what a great benefactor its inventor has proved. His invention has made life easier to everyone, has secured a living to a multitude, has, with the prosperity it has caused, permitted a large increase of population. The increase of people extends the area and power of peaceful labour (if the word civilization be inapplicable), since they will spread beyond the former limits of the community, cultivate more land, raise the amount of produce, and thus add to the augmentation of the general prosperity. After the water-mill comes the windmill, which at once doubles the results obtained by the water-mill, and in addition causes competition, a new factor which works to the consumer's advantage. Later comes the steam flour-mill,

which multiplies these results a hundred times! The modern miller stands intellectually and socially far above his predecessor. He has travelled and has acquired an extensive knowledge of the world; he is more than a trader; he is to a certain extent a learned man: he is conversant with some questions of political economy, and somewhat, may be, with chemistry — a branch of knowledge which enables him to know the different properties of every description of wheat growing in various countries, each weed being affected by the climate and soil. Socially, too, he stands very high; his sons are brought up to become merchants, engineers, manufacturers, politicians, writers, lawyers, scientific men, each of them an agent of progress or a centre of social influence.

Each industry has a history similar to that of milling; so that the preceding description of growth and results applies to brewing, from the poorest beverage to the richest product of the modern brewery; weaving, from sackcloth to silk, velvet, lace, tapestry, and so on; glass-making, from opaque glass to lenses, spectacles, the telescope, the microscope, the spectroscope; metallurgy, from the rough bronze weapon and implement to the steel engine, physical implements, cannon, bridges, tunnels, steam trading and war ships, railways; paper, from packing-paper to the finest vellum, papier-mâché trays, tables, and cabinets; furniture, from the rough stool to the throne; printing, from the label to the book, advertising placards, printed calico, engraving; lighting, from the primitive torch to the oil-lamp, gas, and electric light; [and so forth continuously.[1]

This account reveals clearly the fact that the development of an institution requires ever greater division of labor and ever greater interdependence of men. Increased efficiency demands that the kind of work done by one man be divided among many men who act in close coöperation. In this way, time and energy are saved through "team work," and each man acquires greater skill by confining his attention to a highly specialized kind of work, thus learning to do one thing well rather than many things less efficiently.

[1] Marmery, J. Villin, *Progress of Science*, London, pp. 289–293.

Changes in one institution tend to bring about changes in others. Since education is to prepare for life in all institutions, it would be affected, if not too tradition-bound, by important changes in any of them. Modifications of the school due to the Protestant Reformation and to the growth of industries and of democratic government, need only be mentioned in support of this statement. The mutual influence of democratic government and industries has been very direct. Institutions are all members one of another, and, therefore, must grow with relation one to another.

III

Social development is irregular. (*a*) It is gradual when men keep alive to the intrinsic values of institutional practices, and, at the same time, make progress in means of control; (*b*) it is arrested when they lose sight of the intrinsic ends served by customs; (*c*) it is revolutionary when, through a conflict in social regulations, they lose faith in traditions and reconstruct institutional practices with the advantage of new knowledge developed after the old traditions had become fixed.

Social development has been irregular. Sometimes it has been gradual; at other times it has been arrested or revolutionary. This irregularity is due to three typical conditions which influence social development. Let us now examine these conditions in detail.

(1) The essential condition of gradual development exists when the purposes which institutional practices serve are kept alive in the experience of men. If a practice is followed merely as a tradition, without the appreciation of its purpose, there is no basis for judging whether any particular change would be an improvement or not; but, if the purpose is known, any change is at once tested, and when found to serve this purpose better

is recognized as an improvement. In the great improvement of the locomotive, the automobile, and many machines used in manufacturing, this condition clearly appears. Because men know just what the invention is intended to do, they can recognize certain changes as improvements. What is true of these forms of industrial activities is true of all institutional practices, — political, religious, educational, and domestic. The chief difference is that the ends served by various machines are recognized more easily than those served by complicated social practices.

The development of modern methods of teaching, for illustration, has been gradual in so far as educators have kept before them the ideal of conforming to the nature of the child, an ideal subsidiary to the main purpose served by education. Rousseau, expressing a tendency of his time, called attention to this ideal with convincing force. Basedow, finding that children like motion and noise, followed this ideal in modifying methods. Pestalozzi, in the absence of any scientific treatment of the mind, depended upon sympathetic insight into the nature of the child, which resulted in making his chief contribution, so far as methods are concerned, concrete examples. He did not explain definitely the essential nature of his methods so that teachers by understanding general principles could apply them effectively to the work of teaching. This is one of the reasons why Yverdon became the Mecca for open-minded educators; they went to learn by observation what they could not get from Pestalozzi's statements.

Men of a younger generation undertook to solve the problem of how to describe more definitely a process of teaching conforming to the nature of the child's mind.

In the absence of scientific facts, the answer to this problem made necessary some guiding theory of the nature of mental processes. Three general aspects of mind were recognized, — intellect, will, and feeling, — and, based on the assumption that one or another of these is fundamental, three types of theory of teaching appeared. Herbart assumed the intellect as fundamental, and his problem, therefore, became how to get ideas into the mind. He believed that if the process of acquiring ideas is properly guided, the pupil will feel and act properly. Froebel assumed the will as fundamental, and his problem, therefore, became how to guide the activities of the child. He believed that if the process of will — self-activity — is properly guided, the pupil will have the proper feeling and knowledge. Rosmini, an Italian, assumed feeling as fundamental, but his theory exerted so little influence upon our educational development that we are not concerned with it here.

In answering his problem, Herbart, discarding the old faculty psychology and emphasizing the content of the mind, regarded ideas as having certain affinities which controlled the acquiring and organizing of new ideas. The process of acquiring new ideas he analyzed into four formal steps, — clearness, association, system, and method. Because they show more specifically what should be done in teaching, these principles are an improvement upon the less specific ones attributed to Pestalozzi. Followers of Herbart made further improvement in the direction of specific principles by describing five instead of four formal steps, — preparation, presentation, comparison, generalization, and application. Later the development of psychology, logic, and the theory of knowledge revealed the fact that will, or activity, is fundamental.

Guided by this truth, disciples of Herbart gave more definite meaning to the first step. As previously defined, this step consisted in preparing the mind for new ideas by calling to consciousness acquired ideas related to them. It was now made to include giving the child a purpose, or motive. A purpose is that which a person tries to attain; a motive (cf. *movere*) is that towards which he "moves." Because a purpose which may be served by the subject matter is something definite, this change gave more explicit direction as to what ideas should be called to mind, and was, therefore, a decided improvement. The change, however, made the five formal steps hybrid in nature, because the first step now led the pupil to seek a definite purpose, whereas the subsequent steps neglected this purpose and remained intellectualistic. In order to make the subsequent steps consistent with the first one when modified so as to include a motive, Herbart's guiding conception of the primacy of the intellect must be abandoned. The steps are then those necessary to overcome some difficulty in action by defining and solving a problem, and by using the solution in attaining the original purpose. This *functional* method, which has reference in every step to a definite act pointed out by the motive in the first step, gives much more definite and, therefore, better guidance in teaching than does a method with intellectualistic steps. This functional method is a direct outgrowth of the assumption made by Froebel that activity is primary, an assumption now supported by psychology, logic, and the theory of knowledge. Step by step the functional method has been improved so that now the nature of self-activity and the meaning of the precept "learn by doing" have been made very definite. Each unit of subject matter is regarded as the solution of

a problem arising out of a difficulty in attaining some purpose. Further development of the functional method of teaching is needed, because, although it has clearly analyzed the process by which the pupil acquires knowledge, it has not with equal clearness analyzed the process by which the pupil acquires appreciation.[1] The gradual improvement that has been made in the methods of teaching would not have been possible, if educational thinkers had not kept in mind the purpose of devising principles of teaching that correspond to the nature of the child.

Some general improvements in the school system of England may be cited briefly in further illustration of the gradual development due to continued appreciation of the end served. At the beginning of the nineteenth century, common schools in England were conducted by religious societies largely under the educational ideal of the Reformation. With the growth of industrialism and of democratic government came a general appreciation of the desirability of an efficient school system. A year after an extension of the franchise, the central government, in 1833, began to aid church schools by subsidies. This was an improvement upon previous conditions. In 1870, two years after a further extension of the franchise, board schools were established, since the religious societies did not provide schools in all localities. The board schools were maintained by both government grants and local taxes. This change was a great advance. A further step toward an efficient system of schools was taken in 1899, when a central board of education was established to have general charge over educational matters. Because church schools were not supported so well financially as board schools, and were, therefore, less efficient, they

[1] An attempt to analyze this process is made in Ch. XIII.

were permitted in 1902 to share in local taxes. This act was another important advance. There was still some difficulty because the state did not have sufficient control in the management of church schools, but soon a movement to remedy this difficulty began. In a similar way, other improvements have been made. Thus almost decade by decade the English system of common schools has been improved, because men have kept clearly in mind a definite purpose and have found better and better ways for realizing it.

(2) The condition of arrested development, or formalism, exists when customs are transmitted to younger generations merely as practices which society approves, without any indication of the intrinsic ends which these customs serve. Without knowledge of the end served, one cannot judge whether some particular change is an improvement or not. When practices have become formal, they not only fail to improve, but may even become useless, because of changed social conditions which make the purposes they originally served no longer vital. A most conspicuous example of arrested development is found in the history of Chinese institutions for centuries preceding the present one. Long before the Christian era, China was saved from social disintegration by returning to old practices in the service of unity, harmony, and justice. These practices were described in the Chinese sacred books. To insure the permanence of old customs, provision was made to put in state offices only men well versed in the Chinese Classics. In time, the study of the Classics received strong traditional value, but the purpose which it originally served, — that of promoting unity, harmony, and justice in social relations, — was forgotten. The slightest change in the Classics was not tolerated,

even though it might improve them as means to the ends they originally served. Although centuries of social change not only made the language of the Classics antiquated, but also made the content of little value comparatively, an enormous amount of time was wasted in the study of these ancient writings. Again, in the education of western Europe, the extensive formal study of scholasticism and of Latin and Greek were instances of arrested development. Every social practice tends to become formal, whether in education, politics, religion, or any other institution. Arrested development means formalism, because the vital spirit of a practice dies when the practice is severed from the intrinsic purpose which alone can give it true significance and value.

(3) The condition of revolutionary development appears when a period of arrested development, or formalism, is interrupted by a conflict of social practices. China began a revolutionary advance with the present century. So long as the Chinese wall and the Pacific Ocean isolated China from the rest of the world, and so long as new practices did not through conflict challenge old ones, formal traditions were continued in that country. But when the Chinese, through missionary and merchant, came into contact with practices of the western world, the values of their traditions were successfully challenged in the conflict, and a revolutionary change of Chinese institutions began. In the history of the western world, a number of periods stand out as revolutionary. Prominent among these are the periods of the sophists and philosophers in Greece, the Augustan Age in Rome, the Italian Renaissance, the Protestant Reformation, and the French Revolution. In each case formal customs and beliefs were interrupted by a conflict of social practices and

a revolutionary change in institutions was begun. The present age also is undoubtedly one of important revolutionary advance, as is evidenced by the rapid changes taking place in all institutions.

When social practices become formal and their values are challenged by conflicting traditions, three steps follow in order; namely, (*a*) the loss of faith in tradition, (*b*) individualism, and (*c*) the adoption of better practices with an appreciation of the ends served by them.

(*a*) The loss of faith comes naturally, since the formal tradition is accepted not on account of its intrinsic worth, but because it is indorsed by society. As soon as society is found to indorse also some practice that conflicts with it, the individual does not know which to accept.

(*b*) In the degree that faith in social regulation is lost, individualism, more or less capricious, becomes prominent; that is, individuals follow personal inclinations which may conflict with the social welfare. When external convention does not guide a person's activities, he falls back upon the guidance of feelings more or less primitive and does what he likes to do. Since men differ in their likings, there is lack of uniformity and coöperation in what they do, which makes this individualism conspicuous. This period in which men lose faith in the authority of traditions is a period of unstable morality. A temptation is the result of a conflict between what a person feels under social direction he ought to do and what impulsively he feels he would like to do. If social authority is removed and he is free to do what he pleases, that which would otherwise be the evil in a temptation may now be unchallenged when it appears to control his conduct. He, therefore, neglects his duties in the various social institutions when these duties are not in the direction of his personal desires.

(c) This individualistic tendency is short-sighted and leads inevitably to dissatisfaction. The fundamental values of life can be attained only through methods which are worked out slowly and painfully through years of social coöperation, and which are made more effective by every advance in civilization. The technique for attaining the most important values of life is just what constitutes civilization. Capricious desires of an individual that conflict with it must be disciplined, not clothed with authority. When they get control of conduct, the organization of activities for the attainment of human welfare has given place to anarchy.

Sooner or later the loss of the greater values that make life worth while and the consequent dissatisfaction cause men to turn from individualism and to seek better practices with an appreciation of the ends served by these practices. Inquiry as to what makes life worth while and how it can be attained becomes prominent. Men may thus find anew the intrinsic values of old customs and "go back to the good old times," as the Chinese did when they submitted to the teachings of the Classics; they may accept the customs of another civilization, as the Romans did when they adopted the Christian religion to take the place of pagan beliefs in which they had lost faith, or as the Italians did when, in the Renaissance, Graeco-Roman ideas were introduced; they may strike out anew and develop by their own effort social regulations, as the Athenians did in the philosophical period, and as people of the western world are now doing in a social reconstruction that dates back to the climax of individualism emphasized in the French Revolution. When the period of reconstruction comes, men have the advantage of vital appreciations of worth and of

knowledge acquired after the old traditions were fixed, whether the new development is made under the guidance of borrowed patterns or whether new patterns are devised. As a result, the new practices are better than the old. The adoption of these new practices means social progress.

The analysis of revolutionary advance given above agrees with Spencer's statement of the "three phases through which human opinion passes."[1] He says that these phases are "the unanimity of the ignorant, the disagreement of the inquiring, and the unanimity of the wise," and adds, "They are not sequences in time only; they are sequences in causation." His attention here is confined to revolutionary changes only, because they have been conspicuous in the development of civilization; and what he says about opinion is true of practices, because the former guides the latter. The period of the unanimity of the ignorant is the period of formalism, when, ignorant of the true significance of social practices, men carry them out under the authority of mere custom. The period marked by the disagreement of the inquiring covers the stage of individualism and the beginning of reconstruction. The unanimity of the wise means the general acceptance of practices with a knowledge and appreciation of their true significance. In time, the unanimity of the wise passes over into the unanimity of the ignorant, because knowledge and appreciation of the significance of the practices are gradually lost, although the practices themselves continue under the weight of traditional authority.

Let us now consider a concrete instance of revolutionary development. In early times Athens had a form

[1] Spencer, Herbert, *Education*, 1890, Ch. II, p. 87.

of education which had grown up in answer to the demands of the city-state. Industrial work having been turned over to slaves, the chief social demands upon citizens were to meet the problems of democracy within the state and the dangers of war without it. In educating the citizen-soldier, there were three stages. In the first stage, boys from the ages of seven to sixteen spent half of the day in the palestra, where their bodies were developed by physical exercises, and the other half of the day in the music school, where, learning to "love the things that ought to be loved and to hate the things that ought to be hated," they acquired patriotic and religious ideals. After their hearts had become set on the right things, the youths were given, in addition to physical exercises, an apprenticeship training in the activities of the citizen-soldier. During the period of civic training, which lasted two years, the boys spent half time in physical exercises in the gymnasium and half time enjoying the freedom of the city, where in a very direct way they became acquainted with the civic activities of the city-state. In the period of military training, they spent one year in police duty near the city and the other in active military life on the frontier. At the age of twenty, after the youths had, in these three stages of training, acquired the right purposes and the means of realizing them, they were admitted to full citizenship.

At first these educational practices had strong authority, for they were recognized as necessary to secure peace and justice within the state and protection against enemies without it. In time, however, tradition laid its chilly hand upon them, as the purposes which originally gave them authority became less keenly appreciated. In other words, they became formal.

Mere tradition is strong enough to continue social practices indefinitely, if there is nothing to oppose it, as has been seen in the case of China. But the Athenians were not isolated from the outside world, and, owing to this, opposing traditions eventually made their appearance. The Constitution of Clisthenes admitted to citizenship in the Athenian state all free people of Attica, with purposes and practices differing from those of earlier Athenians. Then came contact with the traditions of the Orient as a result of the Persian wars. Commercial enterprises took Athenians to foreign countries and foreigners to Athens. The enrichment of Athens with money misappropriated from the treasury of the Delian League also attracted many foreigners to the city. Travel and colonization brought still more foreign customs. (*a*) As a consequence, traditions tended to lose authority through conflict, and, in so far as this happened, the individual was deprived of social guidance in which he had confidence. For example, because of the conflicts respectively among the religious, educational, and political traditions of the various people with whom he associated, he lost faith to a large extent in the religious, educational, and political ideals of his ancestors.

(*b*) In the absence of other guidance, the individual was left at the mercy of more or less selfish purposes, from which he had not been alienated in this conflict. Selfish interests differed so that some individuals sought one thing and some another. The desire for wealth, selfish political and social ambitions, and the love of pleasure usurped the place of loyalty to state and religion. Since the life of the soldier was filled with hardship, the youths began to escape it. Since lounging in the gymnasium and conversing with one another were more pleasing than run-

ning, jumping, wrestling, and boxing in the arena, Aristophanes had reason to complain that the youths were becoming "narrow chested and long tongued." Interest in the serious activities of citizenship waned. Ear-pleasing music and love songs encroached upon the martial and religious airs that had predominated in the music school. This condition meant individualism.

A new class of teachers, called sophists, appeared in response to this new demand for individual satisfaction. They came first from the colonies, where the conflict of traditions and a consequent demand for individualistic teachers had taken place at an earlier date. Some of these teachers went so far as to boast that they could teach anybody anything. They taught many subjects, from astronomy to cooking. They gave chief emphasis, however, to rhetoric, because power to persuade is effective in carrying out one's personal ambitions by securing the assistance of other men. Some sophists claimed even that they were able to teach how to make the worse appear the better reason, and thus to enable their students to dupe other people. The extreme individualists said that the individual man was the measure of all things, meaning that his individual feelings should take the place of social regulation. Justice was regarded as the interest of the stronger; or, in other words, with no over-individual regulation, might was regarded as right, when selfish desires conflicted. Consistent with their individualism, sophists demanded money for teaching, because loyalty to the interests of the state was not felt as a motive strong enough to command their efforts as teachers. This was indeed a period of individualism; social ideals had given way, in a conspicuous measure, to selfish ambitions.

(*c*) The stage was now set for the work of reconstruc-

tion. Social regulations are not normally mere impositions upon the individual; they are guides which society, in its generations of experience, has worked out as leading to the highest human welfare. When social regulations lost authority, values less effective in securing human welfare usurped command. The short-sightedness of these selfish purposes led to disappointment. Is not every temptation a struggle between values supported by social authority and what the individual feels that he would personally like to do? If social authority, in the case of temptation, is too weak to command, does he not follow his lower inclinations? And are not these inclinations classified as lower just because they do not serve the greater values of life? Failure to realize these greater values is bound to bring dissatisfaction and consequent attempts to find better forms of conduct.

In Athens, far-sighted men saw that the state, which should bring justice, peace, and security, was going to pieces. When old ideals which had led men to coöperate for the good of all lost their power, when members of the state neglected civic and military training, when they sought private advantage rather than public good, how could it be otherwise? Short-sighted men whose vision went no farther than selfish interests suffered disappointment; for there is a law as old as human nature that man finds his highest salvation by losing himself in the service of others. This law is true because man is by nature a social individual, and the greatest satisfaction comes from acting in accordance with his nature. So among the Athenians there appeared two purposes, one to secure the unity of the state and the other to gain the greatest possible satisfaction in life. In the service of these purposes, social practices must now be put into the melting pot,

the dross must be eliminated, and out of the pure gold in them new practices must be made.

Social and individual welfare are not two different things that normally come into conflict. The highest realization of the one means also the highest realization of the other, for the values which the individual desires are normally social as well as individual. Those who had been strongly influenced by the individualistic movement did not, however, appreciate the value of securing the general welfare. When Aristophanes urged them to go back to the good old times, they did not respond. When Confucius attempted to overcome social disintegration in China by a similar recommendation, his efforts led eventually to success, because China was a monarchy and those who were interested in preserving the integrity of the state had power to give the authority of leadership only to men who were thoroughly conversant with the traditions of the good old times. But Athens was a democracy. The Athenian people had to be interested in a reform before it could be made effectual. So far as the influence of individualism prevailed, they were prone to listen only to words that promised satisfaction to individual desires. Aristophanes, Xenophon, and others who appealed to the motive of securing the welfare of the state found only a weak response, whereas Socrates, who emphasized the problem of how to secure the greatest personal good, quickly gained an audience. He was compelled, however, to confess his inability to solve this problem. Then this question became the heritage of Plato, Aristotle, and less prominent professional philosophers. The problem of Plato's *Republic*, for instance, is, How should a man act in order to get the most out of life? These philosophers, in answer to the question society had thus given them, offered

solutions which were later taken up by tradition as guides for social action. In the field of education, the philosophical schools and other institutions which emphasized the theoretical rather than the practical, were the immediate results. Here the movement hardened into formalism, before the step in social advance was completed. The Romans, however, carried on the movement by putting Greek theory into practice. In the fields of government and religion, Greek philosophy furnished ideas to which the practical Romans gave expression in jurisprudence, Christian theology, the organization of the Roman Catholic Church, and the political organization of the Roman Empire itself. With ideas of social practice, Greece made captive her conquerors, and, as a result, the social reconstruction in the simple city-state became a controlling influence throughout the whole civilized world.

IV

The fine arts, history, and the sciences promote gradual advance, which is the normal form of social development.

In the never-ending road from the state of nature to that of culture, gradual advance is better than arrested development or revolutionary advance. It may be regarded as the normal condition. In arrested development, many institutional practices, because of changed situations, fail to serve the purposes for which they were devised; in revolutionary development, useful practices are often cast aside with the useless; but in gradual advance, institutions are ever undergoing a process of reconstruction which keeps them in the service of their true ends, so far as the stage of knowledge men have attained makes this possible.

The fine arts, history, and the sciences, which ever become more necessary as society grows in complexity, are in the service of gradual development. In a confusing multiplicity of purposes, the fine arts keep men alive to fundamental values; in the intricate relations between means and ends, history reveals the purposes served by institutional practices; in the complexity of means used, a highly developed scientific technique is necessary for efficient control. When there is an adequate appreciation of definite values to be attained and a continuous improvement in scientific control, we have the essential conditions for gradual development.

V

The development of civilisation ever increases the personal freedom of man by revealing to him the intrinsic worth of what he does as the authority for his conduct, and by enabling him to make nature a servant in carrying out his purposes.

In the progress of civilization from nature to culture, society makes the individual more and more a free person. It does this by guiding him to stronger and more definite appreciation of the fundamental values of human life served by social institutions, so that he coöperates with his fellow men in seeking these values from inner choice rather than from external compulsion. The man who coöperates with his fellows from mere individual economic necessity or fear of law, and not because he feels the true worth of what he does as a social activity, is as truly a slave as his horse, which, drawing a plow or a wagon under the compulsion of the bit and the lash, blindly performs a service to society. With the advance of civilization, society not only frees man by revealing the intrinsic values of his activities, but also by guiding him to

greater control over nature in realizing these values. To the extent that he learns how to avoid disease and hunger, and, indeed, how to satisfy every morally legitimate want, he is transformed from the slave of nature to the master of nature. Thus does the development of civilization through the improvement of institutions mark the progress of man from the low plane of animal existence to an ever greater realization of the boundless potentialities of human life.

VI

Natural science regards social development as improvement in the system of group adjustment to environment, and institutions as group habits. In explaining, in accordance with the laws of habit formation, conditions influencing the development of group habits, natural science supports the conclusions reached from the teleological point of view with regard to gradual social advance, arrested development, and revolutionary advance. In explaining the nature of the guidance by the group, it gives the counterpart of civilization guiding man to personal freedom.

Our next problem is to find whether the foregoing explanation of social development is supported by natural science.

In the lower forms of life, each organism is comparatively independent in the process of adjustment to environment. Living as a hermit in its solitary web, the spider gets along very well. In the process of evolution, a great advance was made, however, when the individual organism secured adjustment not alone, but by coöperating with others. Through this change, the group became the unit for adjustment, and the individual organism was no longer self-sufficient. Coöperation brought better adjustment, because, by requiring of any one member of the group only a small part of the reactions, it enabled

the group as a unit to develop a complex system of responses far beyond the capability of any one organism to acquire. The growth in complexity of group reactions is unlimited, because the greater complexity of reactions by the group is balanced by the greater division of them among members of the group. This development has been rapid in the case of human beings, since, having incomplete nervous systems at birth, they rapidly acquire and transmit new forms of adjustment. Natural science explains in this way the general character of human development with its increasing division of responses among individuals and the increasing interdependence of these individuals.

Activities taken over by the group as a unit (1) furnish for individual organisms within the group such necessities as food and shelter; (2) take care of offspring during the period of infancy; (3) bring about in infant organisms the acquired reactions that enable them to participate effectively in group activities; (4) protect each organism from those acts of others which would interfere with the adjustment process; (5) give the greatest unity and harmony in adjustments by making individual organisms, in their divided fields of reactions, respond to the widest environment and promote the adjustment of the group as a whole. The organization of activities that tends to bring about each of these results is an institution. These institutions, it is obvious, are respectively the industries including commerce, the home, the school, the state, and the church.

The natural science explanation of the varying conditions which affect the growth of institutions and, therefore, social development, is made in accordance with the laws of habit formation. Institutions may be regarded

as social habits subject to the laws of habit formation, because the activities which constitute them are habits of coöperating individual organisms. Only through the modification of these habits of individual organisms do institutions change. (1) The condition for gradual development is that in which secondary reactions are not isolated, but remain connected with the fundamental habits the functioning of which they facilitate. The failure of a fundamental habit to function compels changes in the secondary responses connected with it, and when any influence upon the nervous system makes in these secondary responses modifications that result in better functioning of the fundamental habit, these modifications are incorporated with the system of habits. When, however, secondary responses become isolated from the fundamental habits in connection with which they were developed, they may, as explained below, be continued without change. Since means of control correspond to secondary responses, which function in overcoming checks in fundamental habits, and since purposes in the last analysis correspond to fundamental habits, this materialistic explanation supports our conclusion that the condition of gradual advance exists when men recognize the purposes of the institutional practices in which they are engaged. (2) The condition of arrested development is that in which a group of responses becomes isolated from the general system of habits to which it normally belongs, and, consequently, is set off by only a part of the stimuli which normally cause this system of habits to function. James says, "Who is there that has never wound up his watch on taking off his waistcoat in the day time, or taken his latch key out on arriving at the doorstep of a friend?" Winding the watch and taking out the latch

key are, under such circumstances, isolated from the general systems of habits to which they respectively belong, so that they are set off by only a part of the stimuli that normally cause these systems of habits to function. In the one case, winding the watch is isolated from the whole system of habits connected with retiring at night; in the other case, taking out the latch key is isolated from the whole system of habits connected with approaching through a certain street and dooryard one's own house and entering it. Furthermore, only part of the stimuli normally belonging to the situation retiring-at-night in the one case and of the situation entering-one's-house in the other, are responsible respectively for the winding up of the watch and the taking out of the latch key. Let us now consider a similar instance with an extensive group of social habits. The acquiring of the Latin language became the chief part of the school curriculum at a time when this language was the only medium for transmitting a vast range of useful adjustments originated by earlier peoples. It was thus made a part of the great system of educational habits developed in the process of transmitting acquired reactions. Although in time the vernacular languages became better media than Latin for the general transmission of acquired reactions, the study of Latin continued to be the main part of the curriculum, because, in the process of transmission to later generations, it had become isolated from the system of habits in the improving of which it had been incorporated into the school activities. Evidence of this isolation is the fact that the study of Latin was now called forth by only a part of the stimuli belonging to the system of educational habits, with the result that changes in those wider environmental conditions which had been effective

in putting Latin into the school curriculum lost their control over it after it had been put there. The study of Latin was now a response merely to the narrow school situation, and, therefore, was limited to the language itself. Since in the last analysis purposes correspond to fundamental habits, the isolation of secondary responses, as the study of Latin, from the fundamental habits to which they normally belong is, when stated teleologically, the separation of activities from the purposes they normally serve. Thus does natural science support the conclusion reached teleologically that the condition of arrested development is that in which social practices are transmitted without the transmission of the purposes they normally serve. (3) When the group develops extensive new systems of responses because old systems of group habits have by mutual conflict been checked in their functioning, we have the materialistic counterpart of revolutionary development caused by a conflict of traditions. This condition follows a period of formalism, in which responses are more easily overcome because they have been weakened by isolation from fundamental habits to which they normally belong.

The condition of gradual advance keeps up continuously the best possible adjustments of the organism. Under this condition, each change in the environment or improvement in the nervous connections of the organism results in the acquiring of more adequate responses. The fine arts and history promote gradual development by preventing the isolation of reactions from the fundamental habits to which they belong, and the sciences promote it by organizing more effectually the secondary reactions, which correspond to means of control.[1]

[1] See pp. 238–240 and 273–276.

The improvement of group guidance is the counterpart of the advancement of civilization from nature to culture. That this advancement of civilization increases the freedom of men finds its counterpart in the conclusions of natural science. By developing in the organism upon the basis of instincts elaborate systems of response, group guidance makes the organism more self-determined in its reactions. Its coöperation with the group in adjustment is determined by far-reaching systems of response developed in the organism and does not have to be directed at every turn by group interference. Furthermore, as group guidance develops more efficient reactions in an organism, the powers of the latter are extended, because its acts modify the environment in a way that turns external forces to work in its service, as in the use of waterfalls and steam power. Instead of merely remaining subject to the forces in the environment, the organism makes the environment assist in the adjustment. Thus does natural science give the counterpart of the fact that social development guides the individual to greater freedom by making him more self-determined in action and also by making him the master rather than the slave of nature.

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PROBLEMS

1. Show why the responsibility of the school is greater now than it was fifty years ago.
2. Why is the study of education more important now in the United States than it was one hundred years ago?
3. Show how the school promotes social progress.
4. State five important problems peculiar to the United States at the present time.
5. Does society tend to become more unified as it develops? Explain.
6. What is the meaning of democracy?
7. What advantages has a democracy over a beneficent autocracy?
8. How can the United States be made more democratic?
9. Has division of labor tended to make men more or less democratic?
10. What are the main influences that have led to greater centralization of authority in the United States?
11. Explain in detail, from the point of view of education, the essential steps in the advances known as the Italian Renaissance, the Protestant Reformation, and the Naturalistic Movement.
12. Are we living in a period of arrested development, gradual development, or revolutionary advance? Explain.
13. Show that as a result of education you now have greater freedom than you had five years ago.

[redacted]

THE EDUCATIONAL PROCESS

CHAPTER XI

ANALYSIS OF THE EDUCATIONAL PROCESS

The educational process, which is found in all institutions, unites the individual and the social processes by selecting social patterns and by adapting them to the nature of the individual so that he acquires purposes and means of control necessary for social efficiency. The function of the school is to supplement the educative work of the other institutions. Various traditional statements of the aim of education, made with regard to the school, are reconciled in the wider aim of social efficiency, which is emphasized in recent times by the growing complexity of social life and by the scientific study of education. The educative work of all institutions should be rationalized with reference to this aim, which provides for gradual social growth and for free personal development. In rationalizing the work of the school, the most important problems, which must ever be solved anew because of changing social conditions, are those of selecting and organizing the *curriculum* and of finding the *methods of teaching*. These two problems are closely related, the one emphasizing the content of subject matter and the other emphasizing the form in which subject matter is presented.

I

The educational process unites the social and the individual processes by selecting social patterns and by adapting them to the nature of the individual so that he acquires the purposes and the means of control necessary to make him socially efficient.

At birth, the child has only the crude basis for the purposes and the means of control which are necessary to guide his action effectively. He is incomplete; not yet himself. In order to realize the possibilities of his nature,

he must be able to work for a living, but he knows no trade; he must share the responsibility of continuing the race, but he knows nothing of the duties of parenthood; he must help to promote justice and peace among men, but he knows nothing of human rights and duties; he must feel the inspiring thrill of a world purpose which sanctions the highest forms of human development, but he is ignorant of religion. Verily, he must be born again. Just as he passed through a process of development before he was born into the physical world, so he must pass through a superior process of development before he is born into the spiritual world. This superior process of development, in which the individual is equipped with the appreciations of value and the knowledge of control necessary for full participation in social life, is education. Our problem now is to find the general nature of this process.

Education, we have learned, unites the individual and the social processes, which have been described in previous chapters. On the basis of natural endowment, the individual builds new purposes and new means of control in accordance with definite laws. Society furnishes "patterns" that guide the individual to acquire, in accordance with these laws, valuable purposes and effective means of control, which have been the result of ages of social progress and which he could not attain without such guidance. In uniting these two factors of experience, the educational process (1) selects social patterns and (2) guides individual development in accordance with them.

It must select patterns with regard to their social values and also with regard to their adaptability to immature individuals in various stages of development. On

the social side, selection must be made because patterns exist for evil as well as for good conduct. The professional thief, just as truly as the honest business man, is guided in his conduct by purposes and means of control acquired under social direction. Furthermore, division of labor in pursuits which promote human welfare requires that various individuals be prepared for different kinds of activities, each with its peculiar purposes and means of control. Even in the case of primitive peoples, where social patterns are comparatively meager, labor is divided. Men fight the enemies and hunt game, whereas women take care of the children and do the menial work in the camp. As society advances, soldiers, priests, and artisans perform different functions in the social group. Even within these classes there are subdivisions for each of which a special sort of preparation is required. In modern social life, the complex division of labor necessitating different kinds of training is everywhere manifest. Some ideals and methods are, moreover, preferable to others for the same general kind of activity, whether it be in the home, factory, state, or other institution. On the individual side, selection must be made with reference to the development already attained by those who are to be educated; because, as we have found, an individual can acquire new purposes and means of control only on the basis of those already realized in his experience. Social patterns that do not fit his experience cannot function in his development.

After social patterns have been selected, the individual must be put under conditions that lead him to profit by their guidance. Purposes, or motives, to use these patterns must be aroused in his experience; and, where the patterns do not fit well into the purposes and means of

control he has acquired, appreciations must be developed and explanations must be made that prepare a basis of experience necessary to make guidance in accordance with the patterns effective. This work is done usually by persons who have already attained the development represented by the social patterns and who have also a sympathetic insight into the immature experience of the individual to be educated. With the starting point and a near definite goal in mind, they can devise the intermediate steps necessary.

II

All institutions educate.

Every institution educates; it selects social patterns and guides the development of individuals in accordance with them. In a shoe factory, the best ways of making shoes are selected and arranged according to the increasing abilities of employees as they advance to more responsible positions. Individuals are put under conditions which make vital to them the acquiring of means of control necessary for manufacturing shoes, and are helped over difficulties through explanations and demonstrations by co-workers and foremen. They acquire not only means of control, but also purposes which regulate the special kinds of work involved. The minute division of labor and the use of machinery, it is true, have put serious limitations upon the educative influence of many factories, but they have not destroyed this influence. As in the case of the shoe factory, all forms of industry educate. In the home, furthermore, members of the family acquire purposes and means of control selected and made vital to them by this institution. Children are led to appre-

ciate common moral ideals and to understand various kinds of domestic activities. They learn the most useful forms of speech. The home provides, in many cases, the only training individuals receive for the responsibilities of parenthood. By participating in activities of citizenship, men acquire purposes and ideas in the field of government. In the church, they are given religious ideals and trained to carry on the work of this institution. The school develops both the pupils and the teachers.

III

The function of the school is to supplement the educative work of the other institutions where they fail to prepare individuals for effective participation in social life.

The school differs from other institutions in guiding individual development, because education is the essential function of the school, whereas it is only incidental to the work of other institutions. Factories are to produce certain kinds of commodities; the home is to nurture children; the state is to secure justice; the church is to promote righteousness; but the school is to educate. For this reason, the school, under normal conditions, educates better than other institutions. Patterns that constitute the school course of study are selected to develop individuals for many important kinds of activity, not for one particular kind as in the case of a shoe factory, in which the educational influences are limited, in a large measure, to the making of shoes. Pupils are advanced in the school as rapidly as their development justifies, not held back because higher positions are occupied by others. The school constantly influences individuals to make progress, whereas other institutions often leave them undisturbed to continue the same kind of work indefinitely.

Instruction in the school is systematic, according to a more or less definite scientific technique; in other institutions, it consists of haphazard explanations and demonstrations by persons who, unaided by a scientific knowledge of how purposes and means of control are acquired, depend for guidance in teaching upon only sympathetic insight into the experience of the individual needing assistance.

The school exists just because the other institutions fail to give the education required for effective participation in them. In primitive times, individuals were educated only incidentally through imitation and active participation in social life. The school was unnecessary. When advancing civilization greatly increased the demands upon the individual, this incidental education became inadequate. The school was then developed as a social institution to meet the increasing need for an education supplementary to that given by other institutions. Its function is to do what they leave undone in preparing the individual for his place in the social order; or, in other words, to balance the equation between social demands upon the individual and the ability which the individual has acquired incidentally through other institutions to meet these demands.

A few examples of the supplementary character of school education will reveal more clearly the relation between the school and other institutions. The lowest grade of school work is planned for children who can talk and who have other abilities acquired in the home. At one time, the industries educated individuals for special trades by means of the apprenticeship system; but when this apprenticeship system was abandoned, the responsibility of industrial training fell, in a large measure, upon the

school. When the amount of knowledge required for efficient conduct of the home greatly increased through the application of science to household arts, and, at the same time, the educative influence of the home in such matters decreased, the school was called upon to teach household arts. When advanced scientific methods were applied to agriculture, and, as a consequence, life on the farm no longer afforded adequate educational opportunities, the study of agriculture was introduced into schools.

Several institutions have called upon the school for assistance in moral training. The impersonal relations in modern life have removed some strong sanctions of good conduct. Formerly one man worked for another with whom he was personally acquainted and for whom he had usually a friendly feeling. This personal relationship gave a strong sanction to honesty; for, when he looked his employer in the eyes, he realized vividly that his dishonest gain would be an unjust injury to his employer. But when a man worked for a corporation formed by many stockholders whom he did not see, and when he recognized the fact that the stockholders would not feel the slight injury due to a small dishonest gain on his part, this personal sanction was greatly weakened. Close supervision, time clocks, cash registers, specially devised systems of accounting, and other methods have been adopted to remedy this difficulty; but, even under these improved conditions, many persons do not have the equipment of ideals necessary to make them do right. As relations in government became more impersonal, because the authority was more centralized and because the population had increased, moral sanctions due to personal relationship were weakened. Changed condi-

tions of life due to the growth of large cities lessened the moral influence of the home, and changed religious beliefs weakened temporarily the religious sanctions in the experience of many people. Such institutional changes, together with the development of higher standards of right living, have given emphasis to the need of moral training in the schools.

IV

In the wider aim of education as social efficiency, we find the reconciliation of various traditional one-sided statements of the aim of education. Some of these are that education should lead to ideals, knowledge, discipline, culture, individual development, harmonious development of all the powers of the individual, good citizenship, and ability to secure the material necessities of life.

When educators recognize an important demand which changes in institutional life at some particular time make upon the school, the satisfaction of this demand becomes for the time being an aim for educational endeavor. Although this aim marks the change needed for social efficiency in a particular situation, it may assume the importance of the sole aim of education. In this way, various traditional statements of the aim of education have arisen. As Professor Dewey says:

For the *statement* of aim is a matter of emphasis at a given time. And we do not emphasize things which do not require emphasis — that is, such things as are taking care of themselves fairly well. We tend rather to frame our statement on the basis of the defects and needs of the contemporary situation; we take for granted, without explicit statement which would be of no use, whatever is right or approximately so. We frame our explicit aims in terms of some alteration to be brought about. It is, then, no paradox requiring explanation that a given epoch or generation tends to emphasize in its conscious projections just the things which it has least of in actual

fact. A time of domination by authority will call out as response the desirability of great individual freedom; one of disorganized individual activities the need of social control as an educational aim.[1]

Some of the various traditional statements of the aim of education are that it should lead to ideals, knowledge, discipline, culture, individual development, harmonious development of all the powers of the individual, good citizenship, and ability to secure the material necessities of life. Because each such aim calls attention to some needed change in a particular social situation and not to the complete function of education, it becomes inadequate and misleading when new social situations arise calling for new modifications in the work of the school. As partial aims of education, they are included in the wider aim, giving to it a richer meaning and finding in it their own reconciliation. A review of several of these aims will reveal these truths more clearly.

In early Athens, the chief aim of education in the school was to develop patriotic and religious *ideals*, to make the young "love the things that ought to be loved and hate the things that ought to be hated." The main social obligations of free men were domestic, religious, civic, and military. Industrial work was turned over largely to slaves. Youths learned how to meet these obligations by participation in social life other than that of the school. Civic practices, for example, were learned by visiting law courts and public meetings; military technique was acquired by service in the army. This institutional training made them familiar with how to do the things demanded by social life, but it did not develop in them the ideals necessary to insure the doing of these

[1] Dewey, John, *Democracy and Education*, p. 130.

things. Social efficiency, as we have learned, requires more than a mere knowledge of means of control that serve social ends, it requires also ideals that lead men to seek these ends. When the school in early Athens was called upon to supplement the training given by the other institutions, its chief work became, therefore, to instill patriotic and religious ideals into the minds of the young. For this reason, literature and music were the main subjects taught in the didascaleum. This educational aim would be very inadequate for the school in modern times, when the activities of the industrial, political, and other forms of social institutions have become so very complex that these institutions, so far as their educative influence is concerned, fail not only to develop the ideals which they serve, but also to give control of the methods used in attaining these ideals.

At a later period in Athenian education, *knowledge* was emphasized in school practice as the chief aim of education. Human welfare demanded the reorganization of social life. Institutions were degenerating; society was disintegrating; individualism was rife. Regulation devised by reason was needed to save men from the injurious results of individual caprice. Systems of philosophy, therefore, arose to answer the question, How should a man live in order to get the most out of life? The institutions of the time could not give such guidance; they had failed for the very lack of it. The teaching of ideas that should regulate life was turned over, therefore, to the school as supplementary to other institutions. The government required young men of the ephebic corps to study in the University of Athens, where knowledge was stressed. It is true that the reorganization of institutions in accordance with this new knowledge was not realized

until the day of Roman supremacy, but the first step from the injurious results of individualism to a new social order was the development and dissemination of knowledge universally true to take the place of conflicting opinions. This is what Socrates, Plato, and other philosophers sought. Social welfare demanded it. After these general truths had guided in the reorganization of institutions, it became the duty of the school to assist in preparing men to meet new social demands which could not be satisfied by mere abstract ideas. When this was recognized, the pursuit of knowledge for its own sake as the chief aim of the school was stigmatized as unpractical.

When the chief emphasis is given to the regulative influence of social authority, the aim of education appears as *discipline*. All education is disciplinary, because, by the use of social patterns, it regulates the development of the individual in the interest of social demands. Discipline is emphasized as an aim of education when tradition prolongs educational practices which social changes have made less useful, as in the case of the requiring of Latin after a wealth of literature and science had been written in the vernacular. As new conditions cause individuals to chafe under antiquated regulation, the disciplinary character of this regulation becomes conspicuous. When, for example, social changes made individuals dissatisfied with a strongly ascetic training, the fault was attributed to individual nature, and discipline became an educational aim. It was believed that the child had the "old Adam" in him and that his evil nature could be changed into good only through discipline. After scholasticism had gone to seed, the fault of being illogical was attributed to the individual and the need of logical discipline emphasized. More recent instances

may be found in the undue emphasis sometimes given to the formal study of language and mathematics. If the aim of education is restricted to discipline, social progress is checked, because the individual is subjected to an established order continued by force of tradition.

In education organized for a leisure class, *culture* appeared to be the aim. All education is cultural in the sense that it enriches the nature of the individual by transferring to him a social inheritance. As an historical aim of education, the meaning of the term culture has been narrowed, however, so that it includes only those refinements which are not necessary for the work-a-day world, but which distinguish a leisure class regarded as superior to the common man. When the term culture is used properly to mean that which is added to the original nature of the individual, it is too indefinite to be useful as the aim of education. Since an individual cannot acquire all the cultural experience of the race, a useful aim must mark some forms of development as preferable to others. In realizing this more definite aim, the most valuable culture just as the most valuable discipline is gained as a by-product. Culture in the narrow conventional sense tends to dissociate knowledge and appreciation from everyday practical activities, a condition in which true meanings and values decay.[1]

When new conditions make it evident that antiquated social regulations held over from earlier times as mere tradition are interfering with human welfare, *individual development* is stressed as the aim of education. When a change from customary practices is demanded, the responsibility for making this change falls naturally to the rationalized work of the school. A conspicuous example

[1] See p. 145.

of this aim is found in Rousseau's *Émile*. Because some antiquated social regulation was injurious, Rousseau assumed that all social regulation was injurious. This compelled him to seek educational guidance in the nature of the individual alone. Individual development as the aim of education was valuable in the peculiar conditions under which it arose, for it called attention to the fact that man is greater than institutions, that institutions should be in the service of human development, and that education should conform to, rather than be imposed upon, the nature of the individual. When society is not on the verge of revolution, individual development is, however, an inadequate aim, because it furnishes no criterion for selecting the best lines of development. There must be such selection, because the kinds of character that the child may build vary greatly in value. Individual tendencies, which appear in the form of interests, are very unreliable guides in this matter; a person may be interested in doing evil as well as in doing good. The fact that activities which best develop the individual must be interesting to him does not mean that all acts which interest him promote his best development. Seeking educational guidance in the individual nature alone may mean indulging the child upon his own level without directing him to that which is more worth while.

The theory of individual development advocated by Rousseau was mainly negative; it condemned arbitrary and injurious social regulation. When later thinkers attempted to construct an educational theory based upon the nature of the individual, they stated the aim of education as *the harmonious development of all the powers of the individual.* Opposed to traditional restrictions, they believed that education was for the sake of humanity,

which was supposed to be revealed in the nature of each individual. Although individual interests differed, all men appeared to have in common certain powers, or faculties, such as sense perception, memory, imagination, and reasoning. Assuming that these general faculties could be developed by limited specific forms of exercise, they were enabled by this false doctrine of formal discipline to make a plausible constructive theory. Although, so far as the science of psychology is concerned, the "faculty psychology," which this doctrine assumes, is now a matter of the past, it still has a strong hold upon the popular mind. One can easily be misled by analogy to imagine that general powers of the mind, like the muscles of the body, can be strengthened through specific exercise, especially since the forgetting of the details of the subject matter studied does not seem to impair the mental ability gained through study. The most serious weakness of this analogy is the fact that the mind is not composed of "general faculties." Such general faculties exist only as abstract ideas derived from the kinds of work for the performance of which the specific abilities of the mind may be organized; they are not realities in the make-up of the mind. As Professor Dewey says with regard to the definition we are considering of the aim of education:

> If this definition be taken independently of social relationship we have no way of telling what is meant by any one of the terms employed. We do not know what power is; we do not know what development is; we do not know what harmony is. A power is a power only with reference to the use to which it is put, the function it has to serve. . . . . We need to know the social situations in which the individual will have to use ability to observe, recollect, imagine, and reason, in order to have any way of telling what a training of mental powers actually means.[1]

[1] Dewey, John, *Moral Principles in Education*, pp. 12–13.

Since the powers of the individual are manifold and specific rather than few and general, and since the nature of these powers is revealed only in what they lead to in social life, this aim, which centers attention upon the individual, was useful in educational reconstruction only under peculiar social conditions in which individual nature was neglected.

With the growth of democratic government in modern times, the need of loyalty of the individual to the state, intelligence in voting upon political issues, and efficiency in political office, caused *good citizenship* to be stressed as the aim of education. Thomas Jefferson wrote to George Washington: "It is an axiom in my mind that our liberty can never be safe but in the hands of the people themselves, and that, too, of the people with a certain degree of instruction. This is the business of the state to effect and on a general plan." Later George Washington himself sanctioned this idea in a message to Congress when he said: "Knowledge is in every country the surest basis of public happiness. In one in which the measures of government receive their impression so immediately as in ours from the sense of the community, it is proportionately essential." These statements were made in the day of the pioneer, when most forms of institutional life were comparatively simple. The more intricate problems of government made it a matter of serious importance that the people upon whom final judgment in political affairs rested should have a better preparation than that which came more or less incidentally from mere participation in social life. It became the duty of the school, therefore, to prepare for citizenship. However, as institutions other than the state grew more complex and needed the aid of the school to prepare for them, good citizenship became too narrow for the aim of education.

The skill required for success in the modern industrial life has placed so much emphasis upon the need of preparation for making a living that many persons have been led to regard economic efficiency as the chief aim of education. Thus we have what is called the *bread and butter aim.* It is true that the social needs developed by the new industrialism put important obligations upon the school, since the individual can no longer acquire the necessary training by mere participation in industrial activities. The fact that the bread and butter aim is only a temporary recognition of important social changes becomes evident as soon as attention is called to the demands which institutions other than the industries are making upon the school.

There is a tendency to enlarge the meaning of the one-sided aims when changing social conditions reveal their inadequacy. The aim of citizenship, for example, has been conceived by some to include preparation for life in all institutions. Since citizenship has specific reference to the state as a political organization, the use of the term with this larger meaning is liable to be misleading by calling attention to the needs of one institution more than to the needs of others. If knowledge, morality, personal development, economic efficiency, or any other aim is meant to include efficiency in all institutional activities, *i.e.* social efficiency in the widest sense, no fault can be found with the aim, but it should be expressed in terms that ordinarily stand for just what is meant and are not likely to mislead by stressing one part of the meaning and vaguely implying the rest.

V

The growing complexity of institutional life, which requires the school to supplement the educational work of all other institutions, and also the scientific study of education have, in recent times, emphasized social efficiency as the aim of education.

The rapidly increasing complexity of institutions and the scientific study of education have, in recent times, emphasized social efficiency as the aim of education. The marvelous advance in manufacturing and commerce through the use of scientific methods places increasingly difficult demands upon individual workers. The increasing scope of religious activities and the higher standards of home life have a similar result. Democratic government places ever greater responsibilities upon the individual citizens as the corporate interests of cities grow in complexity, as economic, moral, sanitary, and other forms of governmental regulation become more intricate, and as international relations become more far-reaching and complicated. All institutions must now appeal to the school for aid, because efficient participation in them requires much greater training than their educational influence can provide. This condition has led men to recognize the aim of education as efficiency in all forms of institutional life. The growing responsibilities of the school have, moreover, led educators to seek the aid of science in solving their problems. The scientific study of human nature points conclusively to social efficiency as the aim of education. This fact will be explained later.[1]

[1] See pp. 345–346.

VI

Social efficiency as the aim of education neither interferes with social growth by fixing present practices nor dwarfs individual personality by social regulation.

If the aim of the school is to prepare individuals to meet the social demands, does not the school tend to fix present practices and thus interfere with social growth? On the contrary, it promotes social development. Through history and the fine arts, it shows the intrinsic values of practices and thus dispels the fog of formal tradition, which is most potent in keeping civilization on a dead level. An understanding of the purpose of a practice gives the only possible criterion for improving it; one means is better than another only because it realizes the purpose more effectively. Also by training individuals in the latest scientific means of control, the school gives the best possible preparation for finding still more effective methods. Social life demands not merely the acquiring of purposes and means of control already defined by social patterns; it demands also progress in developing new purposes and new methods. The school gives the basis from which this advance is made, and also the methods whereby improvement may be attained. Historians and artists, scientists and inventors, workers in every field who contribute to the improvement of institutions, are prepared by education to do their work.

Does not social efficiency as the aim of education require that individual personality be dwarfed by social regulation? On the contrary, this aim promotes the development of individual personality. The advance of civilization means larger opportunities for personal development. The highest efficiency requires not a mere com-

pliance with the formal demands of group life, but an appreciation and intelligent coöperation with others in realizing values which each individual feels to be worth while as a better condition of the self, and which he seeks not in compliance with an external social command, but in willing submission to his own inner appreciations of worth. He finds the highest authority for social demands not without, but within himself. As Mackenzie says regarding education, in discussing one of its important services: "It is designed to suggest the relations of particular employments, not merely to the whole with which they are immediately connected, but to the system of life whose ends all particular employments subserve. It is intended, in short, to stimulate that intelligent appreciation of purposes which makes almost the meanest employment interesting, and thus at the same time to incite that spirit of service which makes almost the humblest action 'fine.'"[1] In realizing his purposes, the individual would be helpless without social guidance in control. Social efficiency prepares the individual, furthermore, for originality in development, because it prepares him to assist in social advance and to adapt himself to changing conditions of life.

VII

The school cannot through education remake institutions in accordance with some ideal of a perfect society, but is limited in its teachings to the highest social development of the time.

Does not the purpose of education as defined limit the school to preparing individuals for participation in an imperfect society, whereas the school should use its

[1] Mackenzie, J. S., *An Introduction to Social Philosophy*, p. 418.

educative influence to remake social institutions in accordance with some ideal of a perfect society? Perfection cannot be attained in a day; the improving of institutions is a slow and never ending process. History, the fine arts, philosophy, ethics, economics, jurisprudence, political science, sociology, together with the physical and biological sciences, are at work in each institution contributing towards its improvement. The school is limited to transmitting purposes and means of control that have already been developed, tried, and found valuable; it cannot go beyond the best social conditions of the time, however imperfect they may be. Guiding individuals to the best that has been attained, it prepares them to contribute to social progress by taking steps in advance, but the school itself does not make directly these contributions. The socialized individual in whose development the school was a factor, and not the school, is responsible for creating those higher purposes and more effective means of control that mark the pathway towards the millennium. If this is done by men connected with the school, it is done not in the process of educating, but in research and artistic creation.

VIII

The educative work of all institutions should be rationalised. In rationalising the work of the school, the most important problems are those of selecting and organising the *curriculum* and of finding the *methods of teaching*. These two problems are closely related, one emphasising the content of the subject matter and the other emphasising the form in which this content is presented.

Having found the aim of education, let us now consider the means for realizing this aim. That the purpose of education is to increase efficiency is patent in institutions

other than the school; but, since education here is only incidental, the means for realizing this aim are usually not rationalized with a view to making them as effective as possible. Little provision is made to vitalize the activities of the worker by developing in him strong appreciation of the intrinsic social value of what he does; the practical difficulties he meets, and, consequently, the truths he acquires in overcoming them, appear in accidental order rather than in an order that would enable him to acquire this knowledge most economically; the assistance of others in teaching him is seldom guided by an adequate understanding of the process through which individuals acquire means of control.

So far as an institution must educate for the sake of attaining its essential purpose, this education, just as truly as any other means used for attaining the purpose of the institution, should be rationalized in order to make it as effective as possible. This is true with regard to all institutions, — the home, the industries, the state, and the church, as well as the school. The educational work done by the other institutions is no less important, so far as it goes, than the educational work of the school, and should, therefore, be done intelligently. Numerous instances of the recognition of this truth may be found. Some of the larger factories and department stores employ persons whose duty it is to improve the abilities of the employees; magazines for mothers have departments of education as well as of household arts; the church has long made use of the Sunday school.

Since the main purpose of the school is to educate, its activities have been rationally organized, to a greater or less degree, with a view to this purpose. This rational organization is true especially of the formal work of the

classroom. The educational possibilities of many other activities of the school have been comparatively neglected. Discipline, sanitary regulations, games for recreation, athletics, dramatics, social meetings, the reading of library books for the enjoyment of leisure time, entertainments, celebrations, activities of literary, musical, and handicraft clubs, — indeed, all activities of the school should be capitalized for education, if the school is to realize to the fullest extent the purpose which called it into being. When the possible educational influence of activities not included in the formal work of the classroom is recognized, the wider service which the school can render not only to the pupils enrolled but also to the community in general becomes at once apparent.

Since the aim of the school is to supplement the educational influence of the other institutions in making the individual socially efficient, the first problem that appears logically in realizing this aim is to find what purposes and means of control should be given by the school. A study of the social conditions of the time is the first step in answering this problem. Sparta, endangered by slaves within and foes without, required that the youths receive special training to develop in them ideals of patriotism and skill in warfare. When in the Roman state the welfare of society demanded a class of individuals wise in leadership and strong in persuasion, schools of grammar and rhetoric were provided to meet this need. In the early Benedictine monasteries, where social regulation required that men read and study the Scriptures, and participate in religious worship, which included among other things singing and observing holy days, it was necessary for the school to teach reading, writing, the Scriptures, music, and enough astronomy and mathe-

matics to determine the calendar. In the age of chivalry, social life demanded that knights serve lord, lady, and church, and have some innocent employment for leisure hours. The character of the special training, which included such activities as serving tables, jousting, and playing chess, was determined by these demands. At the time of the Protestant Reformation, the school was given the responsibility of training youths in religion together with reading and writing as necessary accompaniments of this. In the modern democratic and industrial age, all forms of institutional life require supplementary aid from the school.

The selection of the purposes and the means of control which the school undertakes to develop has been guided, for the most part, by mere rule of thumb. Under simpler social conditions, this method sufficed, but now that the demands of institutional life have become very intricate and subtle, the school cannot meet its obligations without a thoroughly rationalized investigation of the responsibilities which social welfare places upon it.

The purposes and means of control which society leaves to the school to develop constitute the *curriculum* when they are organized with reference to the various kinds of potential abilities and various degrees of immaturity of those to be educated. The highest efficiency requires specialization in addition to certain abilities which all must acquire in common. Because of the highly developed division of labor in social life, groups of individuals must be trained in special lines of activity for which they are best fitted. It would be wasteful of human energy, moreover, to attempt to develop in the individual advanced purposes and means of control in those years of his life when, on account of his immaturity, he could

acquire them only with great difficulty, if at all. During this period of infancy, the child must be dependent upon others for protection and support where he is deficient in meeting social demands.

The purposes and means of control included in the curriculum are objective and tangible only when they are embodied in some material form such as physical activities, science, literature, and history. These forms, as we have learned, are patterns which guide individuals to new knowledge and new appreciation. Many of them are fashioned, however, to guide only highly developed individuals. The sciences are logically organized and the fine arts are often based upon values which are not appreciated by the immature individual. Both may be unsuited for these reasons to guide directly the development of the immature pupil. Their use is to mark the purposes and means of control which the individual should have after he has been subjected to the guidance of the school; they show the possibilities of individual development. Just as mature plants reveal the value and significance of the seeds from which they developed, so the purposes and means of control selected for the curriculum reveal the value and significance of various tendencies of the immature individual, since these tendencies may in time develop into them.

Since the curriculum is selected primarily with reference to the *kinds* of purposes and means of control required to meet social demands rather than with reference to the *forms* in which these appear as patterns for guiding directly the development of the individual, the solution of the problem of selecting the curriculum does not meet all difficulties which the school must overcome in realizing the aim of education. As soon as the course

of study has been selected, there appears the problem of translating it into forms suited to guide the varied and immature experience of the pupils. The more immature the pupils are, the more prominent is this problem. It may be decided that the highest social efficiency requires an appreciation of the value of following the Lord as represented by the *Twenty-Third Psalm*. This psalm, as we have found,[1] is a pattern for guiding individuals to acquire an appreciation of this value. It was written, however, to guide mature people who lived a pastoral life, who developed under conditions quite different from those of modern times. It presupposes appreciations which they had, but which a child under conditions of modern life does not have. Before he can profit by this literary pattern, he must not merely understand the meaning of the words, but must feel an appreciation for the good shepherd, green pastures, still waters, and other values which the poem is intended to call to mind. An appreciation of these values must be developed out of appreciations he already has before the poem can even begin to guide his experience. In science, the laws of sound, heat, and light are stated in logical form suited to the mature mind; they are meaningless to the pupil until on the basis of his fund of acquired experience he has been guided to a knowledge of aërial, molecular, and ethereal vibrations, and of other things an understanding of which the logical statement of these laws presupposes. This problem is made all the more difficult by the fact that pupils, even those of the same age and opportunities, vary greatly in the basis of experience which must be developed so that the patterns selected in the course of study can be effective. This difficulty makes necessary the teacher, who

[1] See pp. 219–221.

not only must have the experience represented by the curriculum, but also must know the *methods of teaching* in order to guide the pupil to acquire this experience. These methods rest upon laws, or principles, in accordance with which the individual acquires new purposes and new means of control. Only by conforming to these laws can the teacher guide the pupil to realize in his experience the purposes and means of control which the curriculum has marked as essential to social efficiency.

While the complex problem of the school may be simplified by dividing it into the two problems of what should be included in the curriculum and what methods should be used in teaching, the curriculum and the methods should not be considered as separate in reality. They are two aspects of the same thing. In the one case the content of the subject matter is emphasized and in the other the form in which this content is presented is emphasized. The curriculum is always embodied in the form of social patterns for purposes and means of control, and the methods of teaching are always concerned with developing these purposes and means of control. As Professor Dewey says:

> The idea that mind and the world of things and persons are two separate and independent realms . . . carries with it the conclusion that method and subject matter of instruction are separate affairs. Subject matter then becomes a ready-made systematized classification of the facts and principles of the world of nature and man. Method then has for its province a consideration of the ways in which this antecedent subject matter may be best presented to and impressed upon the mind; or, a consideration of the ways in which the mind may be externally brought to bear upon the matter so as to facilitate its acquisition and possession. . . . Method means that arrangement *of* subject matter which makes it most effective in use. Never is method something outside of the material.[1]

[1] Dewey, John, *Democracy and Education*, pp. 193–194.

IX

The problems of the school must ever be solved anew; for, if the school is not plastic to change, its practices eventually lose connection with the ever changing social order, upon which their significance and value depend.

The problems of the school must ever be solved anew; for the school must keep pace with social development. (1) When other institutions develop so as to require further preparation on the part of the individuals who participate in them, but do not increase in educational influence, the obligations of the school are enlarged. New lines of specialization in the work of all institutions illustrate this fact. (2) Changes in the educational work of other institutions modify the obligations of the school, as when the disappearance of the apprenticeship system in industries increased the obligation of the school to give industrial training. (3) The school itself like other institutions changes from time to time as better technique for realizing its fundamental aim is developed. The improvement of scientific methods of investigation in the field of education makes possible better and better solutions of the problems of what should be in the curriculum and how it should be taught. The school has thus a development peculiar to itself.

If the school is not plastic to change, its practices eventually become antiquated. Practices once useful are then continued under social conditions with which they have no useful connection. No longer in the service of social life, they become mere school activities. They are ends in themselves, because they have no further significance. This condition affects both curriculum and methods of teaching, since the two are inseparable. At

the time of disintegration in the ancient Athenian state, social welfare required the reconstruction of institutions on a rational basis. The teaching of philosophic theories, which arose in answer to this need, soon became the chief work of schools founded by philosophers. Later, when pure theory had satisfied the social demand which called it into being and new social needs called for a more immediately practical education, the purely theoretical curriculum, continued by force of tradition, became an end in itself, a mere school requirement. It ceased to be a means for adequately preparing men to participate in the changed social life. Theory became thus separated from practice. To recall another familiar instance, Latin at the time of the Italian Renaissance was introduced into the school as a means of access to the knowledge considered to be most worth while. After a wealth of books had appeared in modern tongues and Latin was no longer all-important as a means of learning, it still, through force of tradition, retained its former place in the curriculum. To the degree that the need of it in preparation for social action decreased, the study of Latin became an end in itself, a mere school activity. Likewise, when scholasticism lost its social importance, it became a mere school practice, and when industrial democracy demanded new forms of education, a curriculum designed to satisfy the needs of a leisure aristocratic class lost its vital connection with life outside the school.

The school finds its highest salvation only when it loses itself in the service of other institutions. Activities that have no significance beyond the school are void of educational value and foreign to its purpose. Since the school was called into being to supplement the educational work of other institutions in preparing individuals for efficient

participation in them, the purposes and means of control embodied in the curriculum should be those vital in the life of other institutions. The essential guide for methods of teaching, also, is found in the nature of institutional activities. "The only way to prepare for social life is to engage in social life."[1] In order to appreciate the values of purposes, the individual must engage in activities in the service of them; in order to understand the real meanings of things, he must use them in a normal way. In solving the problems of what should constitute the curriculum and of how the subject matter selected should be taught, the school must look for guidance to the processes of life in other institutions, which alone give to the school its true meaning and value.

X

In explaining how education selects and transmits to immature organisms forms of adjustment developed in group life, natural science supports the conclusions given above with regard to the aim of education, the relation of the school to other institutions, and the fundamental importance of the problems of the curriculum and of the methods of teaching.

Let us now find whether natural science supports the conclusions we have reached with regard to the nature of the educational process.

We have found from the materialistic point of view that the educative process unites the individual and social processes.[2] The human organism is born with an incomplete nervous system. Reactions such as breathing and swallowing, which are necessary for life, are fully provided for; but the great majority of useful reactions are acquired after birth as the result of the direct influence

[1] Dewey, John, *Moral Principles in Education*, p. 14. [2] Pp. 43–45.

of other organisms or of the changes which these organisms have made in the environment. In this way, each organism profits by the forms of reaction acquired by the race in many generations of progressive adjustment to environment. These acquired reactions serve to make the individual socially efficient, because they are forms of adjustment developed in group life, in which division of activities among various organisms makes the group the unit for adjustment.

The educative process selects forms of adjustment, which appear on the mental side as purposes and means of control, and adapts these to immature organisms. Forms of adjustment must be selected, because the maintenance of group life from generation to generation depends upon each organism's acquiring the special set of reactions that constitute the part it takes in group adjustment, and also because human evolution depends upon the transmission of the best reactions developed by the group and the elimination of the inferior reactions. The forms of adjustment selected are acquired by the individual organism only when adapted to its nature, for the development of new nerve connections depends upon those already made and takes place only in accordance with certain laws.

All larger organizations of group habits which correspond to institutions educate. A factory selects from all possible reactions those which are most effective in producing some commodity. Through interaction with the peculiar environment in the factory, including the equipment and the organisms that have acquired the necessary adjustments, the beginner is guided to appropriate reactions. The factory that fails to do its part either in selecting reactions or in transmitting them to the work-

men goes to the wall in the competitive struggle. What is true of this form of industrial life is true of all institutions. When institutional forms of adjustment became so complex that all could not be transmitted by the institution, the progress of adjustment was checked until group activities which did transmit them were developed. This step was the next essential in evolution. These group activities which supplement the educational work of other institutions constitute the school.

In the fact that the function of education in all institutions is to promote group adjustment, which improves through a gradual process of variation and natural selection, and which involves development of both the group as a unit and of the individual organisms within the group, we find natural science supporting our conclusions that social efficiency as the widest aim of education includes all other valid aims, that the aim of social efficiency provides for both social growth and personal development, and that the school cannot quickly perfect society.

Since the elimination of useless activities in the process of education and the effective organization of useful ones result in better adjustment, and since this elimination and organization appear on the side of consciousness as a process of rationalization, natural science supports our conclusion that the educative work of all institutions should be rationalized. In this process of rationalization, the problems of selecting the curriculum and of devising methods of teaching are fundamental, because they are the mental accompaniments of checks in the essential educational reactions of selecting forms of adjustment and of adapting them to individual organisms. Because of the supplementary relation of the school to other group activities, which are continually changing, effective ad-

justment requires that the forms of adjustment selected and adapted to the immature organisms be modified from time to time. This means on the mental side that problems of the school must ever be solved anew.

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PROBLEMS

1. Explain the following: "When we hear it sometimes said, 'All education must start with the child,' we must add, 'Yes, and lead to human civilization;' and when we hear it said, on the other hand, that all education must start from the traditional past, we must add, 'Yes, and be adapted to the child.'" — Nicholas Murray Butler.

2. Name five things you have learned through the influence of each of the following institutions respectively: the home, the church, the state.

3. What new responsibility has the great division of labor in recent years placed upon the school?

4. What are the educational functions of the home and the church respectively?

5. Under what conditions is the church justified in using its resources to support colleges?

6. What is the nature of educational value?

7. Why must we know the aim of education before we can determine what the curriculum and the methods of teaching should be?

8. Explain how you would determine whether a high school graduate is socially efficient.

9. Ask five persons in various kinds of employment what they consider to be the value of an education and compare the answers given with the aims of education discussed in this chapter.

10. Is the fact that a subject is interesting to the pupils sufficient justification for including it in the school curriculum? Explain.

11. Criticize the statement that the function of education is to give general ideas.

12. State and criticize the doctrine of formal discipline.

13. What justification is there for the following: (*a*) making a common school education compulsory, (*b*) using the taxes collected from the people in the more wealthy districts towards the support of schools in poorer districts, (*c*) appropriating public funds to provide free textbooks for pupils in the public schools, (*d*) expending for the education of students in a state university part of the taxes collected from parents financially unable to send their own sons and daughters to the university?

14. How are the following related: subject matter, curriculum, methods of teaching, learning?

CHAPTER XII

THE PRINCIPLES UNDERLYING THE MAKING OF THE CURRICULUM

Making the curriculum intelligently requires that we begin with the immature equipment of purposes and means of control with which the child comes to school, allow for those which other institutions normally give him, and then find what subject matter will best guide him, from stage to stage of his development, in acquiring the purposes and means of control necessary for efficient participation in social life. In order to do this, we must find (1) what constitutes social efficiency, (2) what education the individual receives from institutions other than the school, (3) what is the nature of the immature experience to be guided by social patterns, and (4) what is the nature of each unit of subject matter available for guiding this experience.

I

The problem of making the curriculum may be simplified by separating it into the four problems noted above. The final test of the accuracy with which the curriculum has been made is found in the social efficiency of those who have been educated under its guidance, provided the methods of teaching are not at fault.

The problem of making the curriculum for the school is that of selecting and organizing social patterns which, in supplementing the educational work of other institutions, point out the most economical steps in development from the meager and crude purposes and means of control which guide the activities of the child to those necessary for efficient participation in social life. As Professor Dewey

says with regard to the subject matter which constitutes the curriculum:

> Abandon the notion of subject matter as something fixed and ready-made in itself, outside the child's experience; cease thinking of the child's experience as also something hard and fast; see it as something fluent, embryonic, vital; and we realize that the child and the curriculum are simply two limits which define a single process. Just as two points define a straight line, so the present standpoint of the child and the facts and truths of studies define instruction. It is continuous reconstruction, moving from the child's present experience out into that represented by the organized bodies of truth that we call studies.[1]

The first step in solving the complex problem of making the curriculum is to separate it into the simpler problems which it includes. These simpler problems can then be considered one at a time. The most fundamental guide in choosing patterns is a knowledge of what is to be made. This is as true in the choosing of patterns to develop a human being as it is true in the choosing of patterns to make a dress, construct a machine, or build a house. Since the curriculum is selected as a guide in making individuals socially efficient, we must know (1) *what constitutes social efficiency.* Since the school supplements the educational work of other institutions and need not, therefore, undertake to do what may safely be left to them, we must know (2) *what education the individual receives from other institutions.* By subtracting from the social demands upon the individual those which are satisfied through training in other institutions, we can find those for the satisfaction of which the school is responsible. We must find next (3) *what is the nature of the immature experience to which the social patterns are to be applied.* This imma-

[1] Dewey, John, *The Child and the Curriculum*, p. 16.

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most efficiently are developed in his experience through the use of subject matter adapted to his experience and related to projects which he willingly undertakes as meaningful and worth while. A curriculum of this nature provides the pupil with activities that are significant and valuable from his own point of view, and at the same time prepares him for greater service from the point of view of society. The appropriate subject matter, as we have learned,[1] not only is a guide to the true appreciation and the intelligent control of present practices, but leads also to the development of new purposes and of new means of control which promote social development.

Much subject matter that is essential to social action cannot be used with advantage until the pupil has had years of development. In the meantime, he must be protected and cared for in so far as, because of immaturity, he lacks self-dependence. For years he must be fed, clothed, and sheltered; and he must also be safeguarded by laws and regulations in the making of which he has no voice.

The final test of the accuracy with which the problem of the curriculum has been solved is found in the social efficiency of those educated under the guidance of the curriculum; for the test of any means is found in its effectiveness in securing the end for which it was devised. Whatever secures this end more fully and with greater economy of time and energy is an improvement. It is true that the curriculum is not the only means used in realizing the aim of education. Inefficiency of the graduates of a school or relatively slow development of its pupils may be due not to a faulty curriculum, but to

[1] P. 334.

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The analysis made of the complex problem of the curriculum is a necessary step in the forming of better judgments of opinion; because the simpler the problem, the easier it is to form an accurate opinion of the solution. This analysis sets, furthermore, the problems for science to solve with its accurate methods, for the first step in scientific investigation is to find the simplest problems into which the complex one can be divided. The situation here is analogous to that of the fabled bundle of sticks which were broken more easily one at a time than all together.

Each of the four fundamental problems that must be solved in making intelligently the curriculum may, in turn, be simplified through further analysis so that it can be solved with greater ease and accuracy.

II

The problem of finding what constitutes social efficiency may be simplified through subdivision by finding what purposes and means of control are required for efficient participation in each of the five great institutional elements of social life. Subject matter selected in the service of demands which these institutions make upon all individuals in common should constitute the required courses in the curriculum; subject matter selected in the service of various institutional demands which division of labor makes upon different groups of individuals only, should constitute the elective courses in the curriculum.

In finding what society requires of the individual for effective participation in social action, we must distinguish between what social action itself requires and what traditional and arbitrary popular beliefs hold these requirements to be. At one time, popular opinion required

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The kind of analysis required to select intelligently the curriculum may be found in Herbert Spencer's essay entitled *What Knowledge Is of Most Worth?* He says:

How to live? — that is the essential question for us. Not how to live in the mere material sense only, but in the widest sense. The general problem which comprehends every special problem is — the right ruling of conduct in all directions under all circumstances. In what way to treat the body; in what way to treat the mind; in what way to manage our affairs; in what way to bring up a family; in what way to behave as a citizen; in what way to utilize all those sources of happiness which nature supplies — how to use all our faculties to the greatest advantage of ourselves and others — how to live completely? And this being the great thing needful for us to learn, is, by consequence, the great thing which education has to teach. To prepare us for complete living is the function which education has to discharge; and the only rational mode of judging of any educational course is, to judge in what degree it discharges such function.

This test, never used in its entirety, but rarely even partially used, and used then in a vague, half conscious way, has to be applied consciously, methodically, and throughout all cases. It behooves us to set before ourselves, and ever to keep clearly in view, complete living as the end to be achieved; so that in bringing up our children we may choose subjects and methods of instruction, with deliberate reference to this end. Not only ought we to cease from the mere unthinking adoption of the current fashion in education, which has no better warrant than any other fashion; but we must also rise above that rude, empirical style of judging displayed by those more intelligent people who do bestow some care in overseeing the cultivation of their children's minds. It must not suffice simply to *think* that such or such information will be useful in after life, or that this kind of knowledge is of more practical value than that; but we must seek out some process of estimating their respective values, so that as far as possible we may positively *know* which are most deserving of attention.

Doubtless the task is difficult — perhaps never to be more than approximately achieved. But, considering the vastness of the interests at stake, its difficulty is no reason for pusillanimously passing

it by, but rather for devoting every energy to its mastery. And if we only proceed systematically, we may very soon get at results of no small moment.

Our first step must obviously be to classify, in the order of their importance, the leading kinds of activity which constitute human life. They may be naturally arranged into: — 1. Those activities which directly minister to self-preservation; 2. Those activities which, by securing the necessaries of life, indirectly minister to self-preservation; 3. Those activities which have for their end the rearing and discipline of offspring; 4. Those activities which are involved in the maintenance of proper social and political relations; 5. Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings.[1]

In classifying the activities for which the individual should be prepared, Spencer has grouped them practically according to the institutional elements of society. "Those activities which, by securing the necessaries of life, indirectly minister to self-preservation" belong to the industries; "those activities which have for their end the rearing and discipline of offspring" belong to the home; "those activities which are involved in the maintenance of proper social and political relations" belong to the state. The two additional classes of activities enumerated by Spencer are in the service of all institutions. This is clearly evident in the case of "those activities which directly minister to self-preservation." Since the body is the "instrument" through which man acts, its preservation is in the interest of all that he does. "Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings," develop ideals which guide in all institutional life; for music, poetry, painting, etc., to the enjoyment of which

[1] Spencer, Herbert, *Education: Intellectual, Moral and Physical*, 1890, pp. 14–16.

Spencer here refers, are valuable not primarily because they give refined enjoyment, but because they develop purposes.[1] As Spencer's essay is written in the interest of the school, the only institution that waits for recognition by him is the church. Although he does not refer to religion in his enumeration of the five "leading kinds of activity which constitute human life," he says later: "Lastly we have to assert — and the assertion will, we doubt not, cause extreme surprise — that the discipline of science is superior to that of our ordinary education, because of the *religious* culture that it gives." And again: "Devotion to science is tacit worship — a tacit recognition of the worth of the things studied; and by implication of their Cause. It is not mere lip-homage, but an homage expressed in actions — not a mere professed respect, but a respect proved by the sacrifice of time, thought and labor."[2]

In analyzing social needs, Professor Dewey classifies them according to institutions, recognizing the school, the state, the home, and the industries. He says:

> We must take the child as a member of society in the broadest sense, and demand for and from the schools whatever is necessary to enable the child intelligently to recognize all his social relations and take his part in sustaining them. . . .
>
> The child is to be not only a voter and a subject of law; he is also to be a member of a family, himself in turn responsible, in all probability, for rearing and training of future children, thereby maintaining the continuity of society. He is to be a worker, engaged in some occupation which will be of use to society, and which will maintain his own independence and self-respect. He is to be a member of some particular neighborhood and community, and must contribute to the

[1] See pp. 185–188.

[2] Spencer, Herbert, *Education: Intellectual, Moral and Physical*, 1890, pp. 76, 77.

values of life, and to the decencies and graces of civilization wherever he is.[1]

In the United States, where religious education is provided by the church, religious needs, to which Professor Dewey does not specifically refer in this quotation, are usually not included among those which the public school is to meet.

If, as Professor Dewey says, "Apart from participation in social life, the school has no moral end or aim,"[2] which is another way of saying that the purpose of the school is to make individuals socially efficient, institutions as the elements of social life must be the basis for the classification of social needs. Social life is life in institutions.

Social demands are of two kinds, general and special. The general demands are those made by all institutions upon all individuals; the special are those made upon only various groups of individuals, because of division of labor. Social efficiency requires of all persons knowledge and appreciation of the common duties of the home, the state, the industries, the church, and the school; for no one can escape responsibilities belonging to these factors of social life. The requirements for all persons in common range from turning properly on public thoroughfares to avoid collision with other persons, to the sentiment of patriotism and the recognition of a world purpose. The special demands are determined by the particular kind of work which, in the division of labor, the individual undertakes. Some may be statesmen, clergymen, mechanics, merchants, or teachers; others may be housekeepers, artists, farmers, doctors, or lawyers. Within each of these and other fields of specialization, there is, furthermore, a com-

[1] Dewey, John, *Moral Principles in Education*, pp. 8–10.
[2] *Opus cit.*, p. 11.

plicated division of labor requiring still more limited specialization.

No absolute distinction exists between these general and special demands; one merges into the other. The interrelation between them is as complex as the social organization itself, so that only the wider differences can be recognized. To the extent that the school is responsible for education, it must, however, define these differences as accurately as possible, in order to indicate in the curriculum what subject matter should be required of all and what subject matter should be open to election by special groups.

As a plan of required and elective work, the curriculum may be likened to a map of social life, in so far as the school is responsible for education; for it shows the road over which all persons should travel in common and the special branch roads which, under the social division of work, particular groups may take with advantage. The beginnings of the branch roads are not limited to the end of the common road, but appear along the way. For the most part, pupils take only a common course until near the end of the elementary school work, where such branches of specialized study as domestic science and manual arts may begin. In the high school and the college, the common road is continued with increasing provision for side-excursions in specialization until the professional schools are reached, where groups separate into different lines of work such as agriculture, civil, mechanical, electrical, and chemical engineering, law, medicine, theology, education, journalism, and business administration. The college of arts and sciences exercises the function of a professional school in the case of those who advance beyond a general training to specialization for constructive work in the

III

Whatever education institutions other dentally while serving in the best man which they have been established, belo stitutions, provided that they give this cally and effectively than the school can education other institutions cannot gi belongs to the school. A rational selecti requires a comprehensive application of

Since the function of the schoo educational work of other institut in the selection of the curriculum tion is given by these other institut to subtract this from the total edu to find what is left for the school t in contact with industrial, political, the individual acquires a large par learns a language, becomes acquai and duties, assists in various kin buys and sells, ch

passu with the rationalized development of the school, it tends to become more definitely organized and effective.

Whether any particular kind of education should be left to other institutions or provided by the school curriculum, does not depend upon capricious changes in other institutions, but upon a definite logical principle. The fact that the work of the school is supplementary to other institutions does not make it subservient to them. It is subservient only to the command of the highest social welfare, which is the same authority that commands them. Since all institutions exist for the sake of promoting the highest social welfare, they should coöperate to do this in the most efficient way. Each institution, therefore, should do with singleness of purpose the special work for which it was established in the social order. Whatever education other institutions give incidentally while serving in the best manner the several purposes for which they have been established, belongs respectively to these institutions, provided that they give this education not less economically and efficiently than the school can give it. Whatever education is needed but cannot be given under these limitations belongs to the school. When the apprenticeship system contributed to the most economical production of commodities, the education given incidentally by it belonged to the industries; when, with the introduction of machinery and of minute division of labor, the apprenticeship system could not be used advantageously in production, the responsibility for industrial education was transferred to the school. When the New England town meeting in early colonial days provided for civic needs, and, at the same time, without being turned aside from this purpose, gave individuals an appreciation of the ideals and an understanding of the methods of

sive application of this principle.

IV

The nature of the pupil's experience r determine the successive stages of his d riculum should mark, and also to deter suited to prepare him to fill, in the socia he is best adapted by natural endowme

When the requirements for soc found and those provided for by been subtracted from them, the scope of the school; they reveal wh education should be, what purpos the pupils must acquire in school places in social life. A knowledge however, an adequate guide for t A map useful for a motor trip to show not only the city and the ge it lies; it must show also the road fr way. The journey from childhoo

These stages depend, in each instance, upon the nature of the child's mind. He acquires new purposes when strongly appreciated values are transferred from ends to means which serve these ends; he acquires new means of control from old ones under the guidance of analogy.[1] If the stages indicated by the curriculum are so far apart that these intimate connections necessary for developing appreciation and knowledge are not provided, the pupil acquires only symbols void of true significance.

A study of individual pupils not only reveals the connected stages necessary for the curriculum, but also shows which of the branch roads required by the division of labor should be included in the curriculum for various groups of pupils. Individuals develop best in those lines of useful social activity in which they have the strongest interests. These feelings of worth, which differ in various individuals, primarily on account of differences in natural endowment, are the dynamics of life. As Professor Hanus says, "Real interest will always be accompanied by capacity for a subject, and may usually be recognized by persistent, independent, and successful pursuit of a subject; for the pupil's spontaneous activity and achievement will always be along the lines of his preferences."[2] The individual interests should always be balanced against the social needs; those that do not lead to useful activity have no authority as guides in selecting the curriculum.

[1] See Chs. IV and V.

[2] Hanus, Paul H., *Educational Aims and Educational Values*, p. 8.

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those units of subject matter which, from stage to stage of the pupil's development, are the best guides to the highest social efficiency.

VI

Some thinkers have made the mistake of attempting to select the curriculum with reference only to the nature of the pupil or with reference only to the subject matter, neither of which is a reliable guide in itself. In such cases, the choice is really made under the guidance of prejudice, which masquerades in the clothes of child nature or of subject matter and thereby escapes the critical examination necessary to purge it of error.

The analysis given above reveals two factors controlled by the school in developing those forms of social efficiency for which other institutions make it responsible. They are the nature of the pupil and subject matter. The former is the " material " with which the school must work and the latter consists of patterns which may be used in refashioning this material. In the selection of the curriculum, these factors have no final significance or value in themselves, but derive significance and value from the aim which the school seeks to realize.

Some thinkers have, however, made the mistake of attempting to select the curriculum with reference only to the nature of the child or with reference only to subject matter. They have believed falsely that their selection depended only upon one or the other of these, when, in reality, it depended upon the insidious influence of tradition. Traditional prejudices intimately associated with the nature of the child or with the subject matter seem in time to be inherent characteristics of these despite the fact that they are foreign. When traditional prejudices become thus disguised as inherent characteristics of child

nature or of subject matter, their authority is not questioned, but blindly accepted. Tradition not purged of error by critical examination is liable to be misleading.

Of those who look to the nature of the child for guidance, some confine attention to the child's interests and others confine attention to formal aspects of his mind, which are known as "faculties." The first group is represented by Rousseau, who believed that just as appetite guides to what one should eat, so interest guides to what one should study. The second group consists of those who believe that the child's mind is composed of "faculties" such as observation, memory, and reason, and that any subject matter which exercises these faculties, irrespective of its particular content, is valuable in developing them. These views have been criticized in the discussion of individual development and of the harmonious development of all the powers of the individual, as aims of education.[1] It is necessary to repeat here only the fact that the child may be interested in evil as well as in good, and the fact that his mind is not composed of "faculties." Moral literature is not chosen for the curriculum because it is more interesting than immoral literature; arithmetic and grammar are not chosen because they better train the "faculties" than do mechanical puzzles and card games. These truths would be clearly apparent if bias in favor of moral literature did not masquerade in the clothes of interest, and bias in favor of arithmetic and grammar did not masquerade in the clothes of formal training.

Those who look to the nature of subject matter for guidance in selecting the curriculum are inclined to regard knowledge and appreciation as ends in themselves. They seek a basis for preference in the structure rather

[1] Pp. 328–330.

than in the function of subject matter; or, in other words, in formal aspects of the subject matter rather than in its usefulness for social action. Specific instances of this view will make clear the fact that, in selecting the curriculum, guidance apparently found in subject matter is really due to the insidious influence of a traditional bias that is so intimately associated with the subject matter as to appear to be an essential characteristic of it.

One of the oldest instances of this view is found in Plato's *Republic*. In the first half of the *Republic*, Plato selects subject matter with reference to social action. He eliminates from the traditional elementary curriculum of his time the subject matter that would develop ideals conflicting with the highest welfare of the state. Near the middle of the *Republic*, however, he transfers emphasis from social action to subject matter. In selecting the curriculum for higher education, Plato stresses the value of knowledge for its own sake. His choice of subject matter is based here upon its degree of abstractness, the more abstract subject matter appearing to him to represent knowledge of higher worth. This leads him to regard pure mathematics and dialectic as of the highest importance. Abstraction is not in itself a synonym for worth, but appeared so to him, because he had acquired a bias in favor of philosophic thought, which is deductive in form and abstract in nature. Not the inherent characteristics of subject matter itself but a bias due to tradition led him, therefore, to regard pure mathematics and dialectic as the subject matter of most worth.

A modern example of the dependence upon characteristics of subject matter for guidance in selecting the curriculum is found in Harris's *Psychologic Foundations of Education*. Harris accepts all subject matter which

... by advising that the curriculum include at all times some subject ma each group. He says:

> The studies of the school fall naturally i groups: first, mathematics and physics; se chiefly the plant and the animal; third, lite chiefly the study of literary works of art; f technical and scientific study of language, l as logic and psychology; fifth, history and t political, and social institutions. Each one be represented in the curriculum of the scho topic suited to the age and previous training

A similar method of selecting studies ondary and higher schools before the tion begins. The student is require in each of a variety of fields, so that be broadened and, at the same time, given him to find the line of specializ his interests.

The method used by Harris aband the preferences which tradition ha

bias. There is no guidance for choice within the groups, except that the " topic " should be " suited to the age and previous training of the pupil." This provision is only another way of saying that the pupil should not study topics which he cannot understand or appreciate. But the vast number of topics he can understand or appreciate, are left on the same level of importance until bias due to tradition steps in to determine the choice. Harris merely simplifies the exercise of this bias by placing before it at the same time for its judgment only one fifth of the topics which the pupil can understand or appreciate in the whole field of traditional learning. The fundamental error of this method becomes apparent as soon as the facts are recognized that the primary function of the school is not to teach subject matter, but to prepare for social action, and that subject matter should, therefore, be selected with reference to the social action which it serves.

VII

The principles presented in this chapter for selecting the curriculum provide for (1) genuine interest in subject matter, (2) normal effort, (3) effective drill, (4) the significant organization of experience, (5) the true differentiation of required and elective work, (6) the highest practical efficiency, (7) the richest culture, (8) the most profitable use of the time devoted to school work by pupils who leave school before having completed the curriculum, (9) the preparation for both life and higher education by the same work, (10) the best standards for selecting the more efficient pupils, (11) the simplification of the curriculum, and (12) the elimination of breaks between schools of different rank in the educational hierarchy.

The simplest way to obviate the faults of the traditional curricula is to select and organize studies in accordance with the principles that have been presented in this

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the pupil requires that the ideal-giving subject matter appeal to purposes he already strongly appreciates and that control-giving subject matter overcome difficulties which lie in the way of ends he desires to realize. School life is thus normal living for the pupil. The application of this principle insures interest, because interest is an essential characteristic of purpose, and is carried over to the means of control which serve in realizing the purpose. The principle that new purposes and means of control when developed should promote social efficiency requires that the interest be genuine. Spurious, or extrinsic, interests, including those which result from "sugar-coated" subject matter, accompany the development of purposes and means of control that are abnormal and, therefore, ineffectual guides for action.[1]

(2) The curriculum secures *normal effort;* it neither justifies the stigma of "soft pedagogics" by indulging undisciplined interests, nor includes tasks that have no significance. It provides the subject matter necessary to develop such ideals as duty, diligence, industry, and persistence, which are necessary to overcome sporadic interests that cause effort by interfering with useful study. Only those conditions of effort to which the individual is subjected in the valuable activities of the wider social life are necessary in education. This fact precludes tasks that are mere tasks, because the effort involved in them has no valuable significance, and is, therefore, superfluous and abnormal.

(3) Adequate provision is made for *effective drill.* Social efficiency requires that the pupil fix in memory such things as the multiplication table and spelling. Since the curriculum should be adapted to successive stages in the

[1] See pp. 133–137.

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cannot grasp the true significance of subject matter organized according to the logic of science, because he neither appreciates the purpose nor understands the method of science. Under the guidance of such subject matter, he fails to acquire for facts even those practical meanings and useful organizations suited to his immature experience. The subject matter appears to him, therefore, to consist of only vaguely significant and arbitrarily classified facts that should be committed to memory. This fault does not exist when the curriculum is adapted to the stage of development attained by the pupil, because, when the curriculum is so adapted, the subject matter is not logically organized until the pupil feels the need for such organization and understands its significance.

(5) The curriculum makes a *true distinction between the required and the elective courses,* serving social efficiency with due provision for individual differences. The required subject matter is that needed by people in general for participation in the various institutions; the elective subject matter is that needed by various classes of individuals for special lines of activity differentiated in the social division of labor. The election of subject matter which promotes efficiency in these special lines of activity, depends upon the dominant interests of the individual concerned. As Professor Hanus says: "Real interest will always be accompanied by capacity for a subject, and may usually be recognized by persistent, independent, and successful pursuit of a subject; for the pupil's spontaneous activity and achievement will always be along the lines of his preferences. Independent pursuit does not mean without the teacher's guidance, but it does mean without the teacher's constant urging or assistance."[1] Abundant

[1] Hanus, Paul H., *Educational Aims and Educational Values,* p. 8.

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(8) Pupils who leave school b
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of school work, this characteristic of the curriculum is of great importance.

(9) The curriculum makes *no essential difference between preparing for higher education and preparing for life.* The lower and the higher education serve the same end and differ only because they guide the experience of the individual at different stages in his development. To the extent that the college forces upon the secondary school subject matter significant only as preparatory for the work of a higher institution of learning, the college defeats its own purpose. If the pupil does not understand and appreciate the vital significance of his school work, he acquires abnormal meanings and appreciations of value, which make an inadequate basis for the higher training of the college. It is better that the candidate for admission to college come with a strong initiative and a wholesome understanding of the simpler practical affairs of life.

(10) The curriculum makes it possible for *the school to exercise properly its important function of selecting the more efficient pupils* for its stamp of approval. Under present conditions, the pupils whom the school most honors are not necessarily those most capable of attaining the highest success beyond the school. This is the case when the curriculum fails to give the guidance intended because it does not fit the experience of the pupil, or when a large part of the subject matter is of comparatively little practical value. Tests used to measure the abilities of pupils often do not reveal these faults of the traditional curriculum, because they measure only the ability to memorize more or less significant symbols. The only reliable evidence of the possession of ideals and ideas is found in the control they exercise over the pupil's activities.

(11) The curriculum is *not overcrowded with subject*

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fact that the curriculum should fit the experience of the pupil requires the introduction of logical classifications only when the pupil has reached an advanced stage of experience in which he has need of them. This requirement means close correlation throughout the curriculum and the elimination of logical distinctions that are not vital to the pupil, both of which tend to prevent the curriculum from being overcrowded with subject matter.

(12) There are *no breaks between the work of schools of different rank in the educational hierarchy.* Different historical origins of elementary schools, secondary schools, and universities, are responsible for breaks between the work of these classes of schools. Democracy has not completely united these institutions into one system. Since there are no breaks in the development of the individual, institutions of different rank should present a continuous curriculum. The parts of the curriculum which tradition has assigned to schools of different rank should, indeed, be subject to change, from time to time, in the interest of a more efficient educational system, in which a convenient and economical distribution of schools is an important consideration. The recent development of junior high schools and junior colleges is an example of such changes.

VIII

The problems which must be solved in selecting the curriculum from the materialistic point of view are: (1) What reactions are necessary for coöperation in each of the systems of group habits? (2) What reactions do systems of group habits other than the school develop in immature organisms not less effectively than the school can develop them? (3) What is the nature of the native and of the acquired reactions of the immature organism? (4) What is the nature of each type of environment available to cause the development of the immature organism's reactions? These correspond to the four problems given in teleological terms at the beginning of this chapter. Natural science supports the conclusions we have reached with regard to (1) the final test of the accuracy with which the curriculum has been selected, (2) the mistaken ideas of the basis upon which the selection should be made, and (3) the valuable characteristics of the curriculum selected in accordance with the principles presented in this chapter.

Does the materialistic explanation of the principles underlying the making of the curriculum support the statement we have made of these principles from the teleological point of view?

In the terms of natural science, the function of the school is to supplement the influence of group habits, otherwise known as institutions, in modifying the reactions of immature organisms in such manner that these organisms react more effectively with others in coöperative adjustment to environment. In order to select, under the guidance of this truth, the types of reactions which the curriculum should provide, we must answer each of the following questions: (1) What reactions are necessary for coöperation in each of the systems of group habits? In teleological terms, this means that we must find what purposes and what means of control are needed for efficient participation in the life of each social institution. (2) What reactions do systems of group habits

other than the school develop in the immature organism not less effectively than the school can develop them? This means teleologically that we must find what education is given by institutions other than the school. (3) What is the nature of the native and of the acquired reactions of the immature organism? It is necessary to know this because new reactions are made through the modification of old ones, and also because different organisms are adapted by nature to play different parts in group adjustment. This means teleologically that we must find what is the nature of the pupil's native and acquired purposes and means of control so that we can select subject matter that is adapted to them. (4) What is the nature of each type of environment available to cause the development of the immature organism's reactions? The answer to this question requires an investigation of the basis of native and acquired reactions which each type of environment is suited to modify, the new reaction which it develops through this modification, and its comparative effectiveness in developing this new reaction. This means teleologically that we must know with reference to each available unit of subject matter the purposes and means of control which its normal functioning requires as a basis, the new purposes or means of control to which it leads, and the comparative economy and effectiveness with which it leads from the one to the other.

In the light of the answers to these questions, we can begin with the immature equipment of reactions with which the child comes to school, allow for those which other group habits develop in the child, and then find what types of environment will most economically and effectively cause it to acquire, from stage to stage of its

development, forms of response necessary for effective coöperation in group adjustment. This is the natural science way of saying that we can begin with the immature equipment of purposes and means of control with which the child comes to school, allow for those which other institutions normally give him, and then find what subject matter will best guide him, from stage to stage of his development, in acquiring the purposes and means of control necessary for efficient participation in the institutions which make up social life.

Provided the methods of teaching are not at fault, the final test of the accuracy with which the curriculum has been made is found, according to natural science, in the effectiveness with which the reactions developed under the influence of the curriculum promote the coöperative adjustment of human organisms to the environment. This fact means that, provided the methods of teaching are not at fault, the final test of the accuracy with which the curriculum has been made is found in the social efficiency of those who have been educated under its guidance.

Natural science shows convincingly that it is a mistake to depend upon either the nature of the child alone or upon the nature of the subject matter alone as a guide for making the curriculum. The development of the immature organism, on the one hand, depends upon an inheritance of acquired characteristics transmitted during infancy through interaction with the group. The instinctive tendencies with which the organism is endowed by nature may be the basis of acquiring all sorts of reactions, many of which are useless. The reactions which, transmitted by the group, constitute the development of the immature organism, are selected as the result of

their effectiveness in adjustment through a long process of group activity; their usefulness is revealed primarily not by the tendencies of the immature organism, but by the achievements of the mature organisms of the group. Subject matter, on the other hand, corresponds to types of environment which induce certain forms of reaction. The usefulness of these types of environment is obviously not revealed by a study of their structure exclusively, but by an investigation of the effectiveness with which the reactions developed under their influence adjust the organism to its environment as it coöperates with the group.

In showing from the materialistic point of view that the curriculum made with reference to the principles presented in this chapter has valuable characteristics, such as providing for genuine interest, normal effort, effective drill, and the significant organization of experience, it is necessary only to mention the equivalents of these in terms of natural science. (1) The curriculum is genuinely interesting, because, by being suited to the nature of the child, it calls forth and modifies strong instincts and habits, and thus reduces to a minimum conflicting responses, the parallel of the feeling of effort, which are accentuated when the selected environment of the school does not fit the nature of the child. (2) It secures normal effort, because the types of environment it provides for the school correspond to the normal environment outside the school. Whatever conflicts of responses occur under such conditions are conflicts which must be overcome before the organism can be adapted to the wider environment beyond the school. There are no mere school situations devised to avoid conflicts on the one hand, or to induce them on the other. (3) Adequate provision is made for effective drill, which is called forth only when it must be-

come a part of some reaction for the successful completion of the adjustment in which the reaction is checked. An adjustment which requires rapid counting may be blocked until drill on the multiplication table modifies the reaction in such manner that it overcomes the obstruction. (4) The organization of subject matter is adapted to the pupil's stage of development, because the curriculum provides for the organization of responses only to the extent that this modifies his reactions in such manner as to make adjustment more effective. (5) The true basis for the distinction between the required and the elective courses in the curriculum is found in the difference between reactions which best promote group adjustment when acquired by all organisms in common and those which best promote group adjustment when divided among various classes of organisms that are equipped by nature so that they acquire more economically and effectively one or another of these special kinds of reaction. (6) The fact that the curriculum provides for the best adjustment to environment means that it provides for the highest practical efficiency. Mere "book learning" is a parallel of changes which books make in the central nervous system and which do not find expression in definite and useful forms of adjustment. (7) Since culture is the parallel of the development of the nervous system through the acquiring of new reactions, the richest culture is provided for, because the richest development of the nervous system is that which leads to the best adjustment to environment. (8) Those who leave school before completing the curriculum, as well as those who do complete it, make the most profitable use of the time they devote to school work, because the curriculum develops the most useful adjustments in the order in which they can be

acquired most economically. (9) The fact that each new reaction acquired under the influence of the curriculum both gives a better immediate adjustment and serves as a basis for acquiring still further forms of adjustment, marks as artificial the distinction between preparation for college and preparation for life. (10) The curriculum makes it possible for the school to exercise properly its function of selecting the more efficient pupils, since this selection can be made only upon the basis of acquired reactions that are effective in adjustment. (11) The curriculum is simplified through the elimination of situations which call forth reactions that do not directly promote better adjustment in the world beyond the school. This elimination prevents the overcrowded condition found in the traditional curriculum. (12) There are no breaks between the work of the schools of different rank in the educational hierarchy, because there are no breaks in the development of the nervous system, in which new reactions are developed through modification of those already acquired.

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PROBLEMS

1. Sometimes boys who make low records in their school work become very successful members of society after they have left school. How would you explain this fact?

2. A prominent educator has said: "I am profoundly convinced

that the greatest educational need of our time, in higher and lower schools alike, is a fuller appreciation on the part of the teachers of what human institutions really mean and what tremendous moral issues and principles they involve." Do you agree with this statement? Give reasons for your agreement or disagreement.

3. What is the function in a democracy of each of the following: the elementary school, the secondary school, the junior high school, the senior high school, the normal school, the junior college, the college, the university?

4. What serious tendency to error should be guarded against in the making of secondary school curricula with a view especially to vocational training?

5. What changes do you wish had been made in the curriculum you pursued in the elementary school? In the secondary school?

6. In the secondary school you attended, point out some of the recent changes that have been made to meet new social conditions.

7. In the secondary school you attended, what should have been the required subjects and what should have been the elective subjects? Why?

8. What should be taken into consideration in determining college entrance requirements?

9. *a.* What is the chief cause of the break students often find in their educational experience when they go from a secondary school to a college? *b.* Is this a fault in our educational system? Explain.

10. What are some of the more important requirements of the work of a teacher for which the curriculum of a professional school for the training of teachers should make provision?

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(3) the over-emphasis of memory wor
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I

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The function of teaching is to supplement the guiding influence of the subject matter included in the curriculum. Pupils who may be regarded as in practically the same stage of development vary greatly in the appreciation and the knowledge upon which new purposes and new means of control can be based; they vary greatly also in their susceptibility to guidance. The subject matter included in the curriculum cannot provide for all these individual differences. Indeed, until the individual is actually engaged in studying the subject matter, the details of the assistance which he needs may not be known. Teaching is required, consequently, to give the detailed guidance necessary for effectively connecting the subject matter of the curriculum with the experience of the pupil. The greater the misfit between the subject matter included in the curriculum and the experience of the pupil, the more is the work of the teacher necessary.

Since teaching is "causing the pupil to learn," and since this can be done only by making the methods of teaching conform to the process through which the pupil acquires (1) new purposes and (2) new means of control, there must be two general types of teaching. Writers on methods of teaching have differentiated a number of types of lessons, such as inductive, deductive, study, drill, review, recitation, lecture, and appreciation lessons.[1] All of these may, however, be classified under the two main types mentioned; their functions are to give either new purposes or better control. The appreciation lesson is to give a new appreciation of value, or, in other words, a new purpose; the inductive, deductive, and drill lessons are primarily to give better control; the study, review,

[1] See Strayer, G. D., *A Brief Course in the Teaching Process*, pp. 41–112.

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automobile runs effectively, no interference with it is necessary; but if the mechanism does not run effectively, one must understand the steps in the transmission of power from the gasoline tank to the wheels in order to locate and to overcome the difficulty.

II

In the teaching of history, which is purpose-giving subject matter, the steps are to make the pupil (1) appreciate the purpose which induced people of the past to devise the institutional practice he is studying historically, (2) associate with this purpose the practice as a means devised for attaining it, and (3) accept in imagination the practice as serving the purpose.

Let us now consider the teaching of history in the light of the steps through which an individual acquires new purposes. These steps, as we have learned, are (1) a feeling of the value of some purpose, (2) the associating with this purpose of some means for its realization, and (3) the use of this means in realizing the purpose.[1]

(1) The purposes which the pupil should appreciate in the study of history are those that led people in the past to devise the various institutional practices into which history gives an insight. There must, of course, be some purpose which leads the pupil to turn from his present activity, whatever it may be, to the study of history. This may be a desire to get a better appreciation of a specific practice or of a system of practices in government, religion, education, or some other human activity. It may be a desire to enjoy an hour of reading or to fulfill some requirement in professional training. The motive mentioned first is the best, because it leads the pupil to understand the true function of his study. These motives,

[1] See Ch. IV.

however, are soon combined with a sympathetic appreciation of the aims that guided the activities of the men whose history he is studying. If history is uninteresting to the pupil when it is neither too elementary nor too advanced for him, the subject matter is either badly written or poorly taught. It should enable him to relive the most exciting events in the drama of life, events which have involved important changes in social practices and which for that reason must have been accompanied by strong purposes and anxious thought. When the pupil stands with the embattled New England farmers in their struggle for democracy, he may forget that he began this study in order to acquire a truer appreciation of present democratic practices. If his appreciation of those purposes which guided the development of our political practices is strong enough to drive the present from his consciousness, we can rest assured that when he has traced the historical movements up to the present, the activities of to-day will return to his consciousness enriched by the significance and the value with which these older purposes have endowed them.

The fact that the best motive for studying history is to get a better appreciative understanding of present practices does not mean that the course of history should be traced backwards from present practices. This procedure would be as abnormal as that of reading a story or a drama backwards. Later purposes and problems get their value and meaning from those which have gone before just as truly in the case of society as in the case of an individual.

Although the motive which has led the pupil to open his book of history may linger in the background to strengthen and guide his interest in the subject matter,

the first step peculiar to the teaching of history is that of leading the pupil to appreciate the purpose which has called forth a new social practice. If the study of classical Latin at the time of the Italian Renaissance is the new practice to be considered, the pupil who is familiar with the formal practices before that time should be led to have a vivid appreciation of the new ideals, — political, industrial, commercial, etc., — that conflicted with the authority of old traditions, made these old traditions unsatisfactory, and precipitated a period of individualism in which men's attention was centered anew upon the values of human life. In order to appreciate this situation, the pupil must *feel* the values of the new ideals which conflicted with the old. If he does not feel these values, the words which he uses to describe the situation lack true significance for him. In order to assist the pupil to acquire this appreciative understanding of the situation, the teacher is justified in appealing to the pupil's own experiences, which, indeed, are the only material at the teacher's disposal for creating the situation in the pupil's imagination. Analogies are useful here. The pupil has experienced new values in conflict with old ones. The teacher as an artist may use this and other experiences in assisting the pupil to rebuild in imagination the purpose which led to the introduction of the study of classical Latin at the time of the Italian Renaissance. Mere generalizations which do not appeal to the pupil's feeling of value are cheap substitutes for the definite appreciations which should be given in this first step in the teaching of history.

(2) When the pupil has acquired an appreciation of the purpose which called forth a new social practice, he should be led to associate with this purpose the new practice as

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(3) So long as the pupil is d
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which, in turn, were responsible for this change. Later, as he reaches in his study the apparent enrichment that comes to this formalism when it is regarded as a means of formal discipline, he should be led to appreciate the value of mental power as it was then understood, in comparison with the value of any specific content of facts. At that time the facts one might learn appeared comparatively narrow and limited in application and not at all certain to be those needed later to guide one's activity, but mental power was evidently useful in the guiding of activity in all situations. Facts could be acquired readily when needed, but mental power could be developed only by a long process of training. To those who believed in formal discipline it appeared that the formal study of language would develop this mental power. Although later thinkers have proved the doctrine of formal discipline to be erroneous, the student of the history of education should appreciate how it appeared to the people of the period he is studying.

If the pupil does not know that the doctrine of formal discipline is erroneous, the teacher may prevent the fixing of this false idea by remarking incidentally that later scientists found the doctrine of formal discipline untrue; but the detailed study of the scientific refutation of this doctrine as it appeared later in the development of educational thought would, if introduced in the study of the time when the doctrine first appeared historically, spoil the pupil's historical perspective. In the study of the history of education, the pupil should not take up this refutation until he has reached the period in historical development when it appeared.

The general steps that have been illustrated above are essential to the teaching of any historical change, whether

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Many teachers now believe that the pupil should learn history by solving problems. The principles of teaching given are entirely consistent with this belief. Without problems the pupil does not think in his study. The steps which we have outlined make adequate provision for thinking and are intended to show what kinds of problems, subsidiary to these steps, the pupil should undertake to solve. His problems should assist him in acquiring the experience called for by the essential steps in the study of history. These steps, to repeat, are (1) to appreciate the purpose which induced people of the past to devise the institutional practice he is studying historically, (2) to associate with this purpose the practice as a means devised for attaining it, and (3) to accept in imagination the practice as serving the purpose. The pupil is not studying history if his problems are to find what lessons people of the present may learn from the experiences of earlier generations or to estimate the values of earlier practices in the light of scientific conclusions of the present. If these are his problems, he has turned from the study of history to the study of science, the function of which is not to give appreciative insight into present practices, but to perfect our present practices when their aims have been intelligently appreciated.

III

In the teaching of literature and of the other fine arts, the steps, which correspond to those in the teaching of history, are to make the pupil (1) appreciate through *analysis* and *synthesis* the value presented in the work of art, (2) associate with this appreciated value the means of realizing it, and (3) use the means in attaining the value.

Let us now consider the teaching of literature and of the other fine arts in the light of the three steps through

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literary selection into the particular values which it presents. After feelings of worth have thus been developed separately, they should be combined into a unitary appreciation. This *synthesis* comes through experiencing the literary selection as a whole. Let us now consider illustrations of the use of analysis and synthesis as the means of securing the appreciation of worth, which is the first essential step in the teaching of literature.

The *Twenty-Third Psalm* normally presents a number of particular values, such as those of the good shepherd, the still waters, the green pastures, and the protection against enemies, while the rhythmic form of the poem makes a direct appeal to feeling. The experience of a pupil in modern times is so different from that of the primitive people for whom this poem was written that for him the images presented probably do not carry with them strong feelings of worth. He has not acquired strong purposes to attain the things which were of paramount importance in the life of a pastoral people. If he does not appreciate these values, the teacher should lead him to analyze the psalm into the particular images presented and to study each separately. In accordance with the law which controls the development of new purposes, the teacher can then develop a feeling of value for the good shepherd, the still waters, the green pastures, and the protection against enemies, by presenting each of these as a means of realizing purposes for which the pupil has acquired appreciation. The teacher should lead the pupil to build through constructive imagination concrete imagery of the precarious life of a pastoral people that would enable him in a measure to relive the experiences which caused them to appreciate strongly the images presented in the psalm. For example, the pupil, drawing

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Let us consider next the teac
entitled *Cleon*. Browning rep
the richest blessings the world
after image to create an apprec
He says:

> The master of thy galley still
> Gift after gift; they block my
> And pile themselves along its
> Royal with sunset, like a thou

Appreciation of the value of the
poetic description of them. Na
has been generous with Cleon, w

> I have not chanted verse like
> Nor swept string like Terpand
> And painted

Rose-blood upon its petals, pricked its cup's
Honey with wine, and driven its seed to fruit,
And show a better flower if not so large:
I stand myself. Refer this to the gods
Whose gift alone it is! which, shall I dare
(All pride apart), upon the absurd pretext
That such a gift by chance lay in my hand,
Discourse of lightly or depreciate?

Although Cleon has all these blessings, both material and spiritual, he longs for a personal immortality compared with which these blessings amount to nothing. This desire is expressed in the words:

I dare at times imagine to my need
Some future state revealed to us by Zeus,
Unlimited in capability
For joy, as this is in desire for joy,
— To seek which, the joy-hunger forces us:
That, stung by straitness of our life, made strait
On purpose to make prized the life at large —
Freed by the throbbing impulse we call death,
We burst there as the worm into the fly,
Who, while a worm still, wants his wings. But no!
Zeus has not yet revealed it; and alas,
He must have done so, were it possible!

If the poem does not excite appropriate feelings on the part of the pupil, the teacher should lead him to analyze it into the various images presented and to acquire an appreciation of each image. The pupil should in imagination see vividly the rich gifts along the portico royal with sunset; he should appreciate the significance of Homer, Terpander, and Phidias; he should feel Cleon's despair despite worldly blessings, when, confronted only by death and oblivion, he longs for "some future state . . . unlimited in capability for

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to the value for which Cleon longed,[1] the pupil may need the assistance of the teacher in associating the means with the end. If such assistance is needed, the teacher should lead the pupil to make the association by suggestion rather than by telling him directly. In so far as the pupil himself discovers the connection between the means and the end, the effect is more vivid and lasting. In Tennyson's *Flower in the Crannied Wall* the pupil should be led to recognize the little flower as a means of revealing the mysteries of the nature of God and man; if the individual could only understand the flower, he could read in it the secret of the universe.

It is not necessary that the second step follow the first in time; the two may be taken at the same time, in which case the second step is distinguished from the first logically rather than chronologically. In the *Twenty-Third Psalm*, following the Lord is represented as the means for the attainment of each value in turn when this value is called to mind. The synthesis of values which combine to make the reader desire to follow the Lord as the sheep follow the shepherd takes place normally while the means is being associated with an end in each new image called to mind. In *Cleon*, on the other hand, the unitary appreciation is developed before Christianity is suggested as the means of realizing it.

(3) In accordance with the law which controls the making of new purposes, the third step in the teaching of literature is to provide opportunity for the pupil to use the means in realizing the end. The simplest action that the pupil can take in this direction is to acknowledge the truth of the relationship between the means and the end

[1] This suggestion is made by the incidental reference to St. Paul in the last stanza, which is quoted on page 222.

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cations of each to consciousness, his appreciations are strengthened. When, later, he studies the painting as a whole, these feelings become united into a single appreciation. In assisting the pupil to study the *Laocoön Group*[1] the teacher, allowing the pupil as much initiative as possible, should guide him to study such elements as the beauty of form and the strength of body of Laocoön and his sons, the physical suffering of the helpless victims of the serpents, and the father's grief over the terrible death which he has brought upon his innocent offspring. Consideration of the statue as a whole will then unite the feelings incited by a study of the elements. To increase the pupil's appreciation of a musical composition, the teacher should direct his attention to such elements as the chief theme, its development and relation to secondary themes, the flow of melody throughout the piece, and the harmonic structure of the composition. In order to increase the pupil's appreciation in this study, the teacher may use tones and combinations of tones for which the pupil has acquired appreciation; he may use also imagery that carries with it in the experience of the pupil feelings similar to those which the music should excite. A synthesis of the feelings developed through a study of the elements is made when the selection is heard as a whole.

(2) As the second step, in the case of Turner's *The Slave Ship*, the teacher should guide the pupil to recognize a causal connection between slavery and the horrible scene of the slave ship so that the pupil may feel through a transfer of negative value an aversion to slavery. In the case of the *Laocoön Group*, he should lead the pupil to recognize that Laocoön's defiance of a supernatural power led to the suffering represented by the statue. In the

[1] See pp. 228–229.

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IV

In the teaching of history and of the fine arts, the methods that should be used in the study, the review, and the examination lessons depend upon the steps in teaching explained in the two preceding sections.

We have thus far considered the teaching of history and of the fine arts when the teacher is with the pupil throughout the work. Let us now apply the principles for teaching new purposes to the study lesson, in which the work is done in private, and to the review and the examination lessons.

In assigning the study lesson, the teacher must anticipate the difficulties of the pupil and give him the guidance necessary to overcome them. In the case of history, study should consist of reading plus thinking. The reading matter is easily available in the textbooks; the pupil needs the teacher's guidance merely with regard to what he should think about in connection with his reading. Should he try merely to understand the sentences of the book in the order in which they are given? Should he try to remember the facts as they are presented in the book? Should he make an outline of the important topics and commit this outline to memory? Since study is self-teaching and since history is purpose-giving subject matter, the principles which control the making of new purposes should indicate to the teacher that about which the pupil should think. If the subsidiary problems thus indicated are difficult, the teacher should give the pupil the guidance he needs in order to solve them. The amount of assistance necessary in the assignment of the lesson decreases as the pupil gains the ability to direct his own study, or, in other words, to teach himself.

The assignment should give the pupil a definite motive

for further study and also a knowledge of the method he should use in order to get the results intended. In making the assignment the teacher should be guided by the same principles that guide him in the recitation lesson described above. The only difference is that his guidance must be given before the pupil begins to study and not from step to step in the progress of the study.

Let us consider, for example, what the teacher should do in assigning a lesson through the study of which the pupil is to acquire an appreciation of the new educational purpose responsible for the important changes in education in Massachusetts from 1835 to 1860. The main problem for the pupil to consider in his study in this case would be why the people became dissatisfied with the traditional educational practices and sought to change them. As the people became dissatisfied with the traditional education because they had a new educational purpose, the pupil in answering the question adequately should be led to acquire an appreciation of this new purpose. The statement of this one problem may be all that is necessary to guide the private study of an advanced student. In the case of a less advanced pupil where further guidance is necessary, the teacher may assist the pupil to imagine the educational situation in Massachusetts. He may call the pupil's attention to the religious purpose which was responsible in a large measure for the educational practices of the time and to the weakening of this purpose by toleration, the rise of various creeds, and the tendency to transfer the burden of religious education from the school to the home and the church. He may call the pupil's attention also to the rise of the district school system, and to other matters which would help him to appreciate the educational situation with

which the new purpose made the people dissatisfied. If still more specific guidance is needed, the teacher may ask the pupil to find why the growth of the democratic government since the American Revolution, the growth of cities with manufacturing interests fostered by the tariff of 1816 and the acquaintance with the changes which the Pestalozzian movement brought about in Prussian education would make the people dissatisfied with their schools. When in solving these problems the pupil is led to appreciate the new political and industrial purposes and to see how the people recognized that the school should serve these new ideals, he can then appreciate practical efficiency as a new educational purpose. The appreciation of the end is transferred to the means as both are associated in the mind of the pupil. This appreciation may be made more definite in the light of the criticisms which those still interested in religious education and in classical education made of the new educational tendencies.

A lesson assignment to find the new purpose which was responsible for changes in political, industrial, religious, or other social practices may be made in the same way. The pupil should be given the problems of finding what caused dissatisfaction with the old practice, and what influences established the new purpose. In solving these subsidiary problems through private study, he is guided through the steps necessary to give him an appreciation of the new purpose.

If the main aim of the lesson assigned is for the pupil to learn the new practices introduced at any particular time, the teacher should in the assignment call the attention of the pupil to the new social purpose in the interest of which these new practices were devised, and leave

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The steps in the making of a new purpose, which we found at the basis of method in the teaching of history, should be the guides in the review and the examination lesson.

The main purpose of the review lesson in history is to organize the pupil's historical experience which has been developed through detailed study. The basis of this organization should be the more comprehensive purposes which have led to changes in social practice. This organization should be kept intact from detailed lesson to detailed lesson by connecting the particular period studied with the general movements which have preceded it. In this way the details will appear in relation to a comprehensive organization of such general movements as the Italian Renaissance, the Protestant Reformation, and the movements towards political and industrial democracy. Subdivisions of these should also be made on the basis of purposes. For example, the Protestant Reformation, which emphasized the value of ~~intelligent~~ faith for salvation, logically led to the movements for universal, vernacular, and compulsory education, which in turn became the ends to be attained. In Germany it led to the ideal of state education and in England to the purpose of education under the direction of church societies, etc. If the pupil has learned through detailed analysis all the particular movements, the various minor purposes involved, and the changes in practice to which they led, his whole experience of the general movement is unified through review.

To determine directly by examination whether the pupil's study of history has brought the results for which historical study is normally intended, is difficult, because these results are appreciations of value. We can, how-

an historical situation is to ha
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questions as the following: Wh
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Herbert Spencer would have ma
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What reply would those under th
educational practices at some pa
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who advocated changes in their

If the pupil answers such ques
out assistance when they are put
time, he probably has an appre
educational situations involved i
over, it is economical to test the
situations by one question and ar
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educate him by strengthening a
historical experience.

forth. The images of the *Twenty-Third Psalm* were undoubtedly accompanied by strong feelings born of experience on the part of those who, like David, lived a pastoral life, but these images may arouse only a weak response in the experience of persons living under modern conditions. The poem *Cleon* would make an immediate appeal to a person with the rich experience of Browning, but the immature pupil may have to acquire a variety of new experiences before he can appreciate the values which the imagery of the poem would normally call forth. When a work of literary art does not make an immediate appeal to the experience of the reader, study is necessary to furnish him with an appreciation of the values which the images should call forth. This fact points to the character of the problems necessary for a study lesson in literature. These problems, which should always be subsidiary to the main steps in the teaching of literature, should lead the pupil to acquire the experience which will enable him to feel the values that the work of literary art should normally call forth. In his book *The Teaching of Poetry in the High School,* Professor A. H. R. Fairchild says:

> The study of a poem, unless the poem be of the very simplest kind, should always begin in class; if, in beginning a poem, an assignment for home study is made at all, it should be in material bearing upon the poem and essential to understanding it, not a part of the poem itself.
>
> The reason for this plan becomes apparent on a moment's reflection. The study of poetry in the high school implies that the poem in hand represents some thought, feeling, or action that is an ideal for the pupil. To the teacher this ideal may be very simple, very elementary, perhaps long since attained; but for the pupil it represents something relatively new or as yet unattained in experience. Required to make his own start in beginning the study of a poem,

lacking the inspiration of the teacher and the stimulus of the class, blocked frequently by unfamiliar allusions and confused imagery, the pupil easily becomes discouraged and turns from his task in weariness and defeat. On the morrow he does not know his "lesson." The teacher works in vain against a dogged opposition; and the finest pedagogical efforts toward stirring interest and awakening enthusiasm fall dead. The pupil is right, the teacher wrong. The pupil's lack of interest, his opposition, even his dislike for poetry are the natural and almost inevitable result of a vicious method. What the pupil usually lacks is the necessary imagery or information to make the poem intelligible to him. Without this "apperception mass," as the psychologists call it, any poem must be largely misunderstood, if indeed it does not appear to be veritable rubbish.[1]

When the teacher has secured motivation for the study of the *Twenty-Third Psalm*, problems assigned to direct the pupil's private study should lead the pupil to an appreciative understanding of the life of a pastoral people. The answers to these problems may be found in assigned readings. Similarly when the teacher has secured motivation for the study of the poem *Cleon*, he should assign problems which will guide the pupil to appreciate the various values which the poem presents. What these values are in the case both of the *Twenty-Third Psalm* and of *Cleon* has been explained in the section regarding the teaching of literature. There may be other problems intended to lead the pupil through the other steps which he must take in order to profit by the literary production; but these steps are so subtle, so difficult to anticipate, that it is ordinarily better to leave them until the pupil has made the preliminary study discussed above and the teacher is present to follow the pupil's experience from detail to detail and to give him the necessary direction when in this way it is found to be needed.

[1] Pp. 71–72.

The study lesson in the other fine arts is analogous to that in literature. The problems given to direct the pupil's study should be those necessary to bring his experience to the stage at which the work of art will make a direct appeal to his feeling. In the case of the *Laocoön Group*, such questions should be asked as will call the attention of the pupil to the story the culmination of which the statue represents, and to those details of the statue which make a strong appeal to feeling. In the study of Turner's *The Slave Ship*, questions should be asked which will lead the pupil to understand the nature of slavery and to appreciate the significant details of the painting. As in the case of literature, the problems assigned to guide the pupil's study should always be subsidiary to the main steps in the development of a new purpose.

In a review lesson covering various works of fine art, care should be taken that the unity of each is not lost in details. While the pupil may refresh his experience of some of the details, the main emphasis should be given to impressing upon him the unitary value which each work of art presents.

It is difficult by examination to obtain evidence of feelings of value, which, as in the case of literature, are the normal result of the study of the other fine arts. One way of testing the result is to find whether the pupil has passed through the steps necessary to attain it. This indirect method is to question him with regard to the steps which we have emphasized as necessary for teaching the work of art. A more direct way of finding the result is to have the pupil make judgments of value on the basis of the new appreciation of worth which the study of the work of art has given him. In the light

of such study, he may be asked to pass judgment upon some type of character or to compare the values of specific acts.

V

In the teaching of control subject matter, the steps are to make the pupil (1) try to attain some purpose in the realizing of which he meets a difficulty that can be overcome by the new means of control about to be presented, (2) locate the difficulty by making and testing hypotheses, (3) solve in a similar way the problem arising from this difficulty, and (4) use the solution in attaining his original purpose. In the second and third steps, which are the most difficult ones, the teacher should guide the pupil from the known to the unknown by calling his attention to familiar facts which through analogy suggest the proper hypotheses and to those which test the truth of the hypotheses made by the pupil.

In order to find how a new means of control should be taught to the pupil, it is necessary for us to recall the essential steps in the complete thought process through which a new means of control is made. These steps are (1) feeling a difficulty in the realization of a purpose, (2) defining the problem by making hypotheses based upon analogy and testing them either in thought or in action, (3) solving the problem through making hypotheses based on analogy and testing them either in thought or in action, and (4) using the means thus found in realizing the original purpose.[1] In the light of our discussion of these steps, let us now find the essentials in teaching a means of control.

(1) The first step in teaching a control lesson is to lead the pupil to try to attain some purpose in the realizing of which he will meet a difficulty that can be overcome by the new means of control about to be presented. This step is commonly called *motivation*, a word derived from

[1] See Ch. V.

the Latin verb *movere*, meaning *to move*. In this step the pupil *moves* towards the realization of some end he has in view.

The purpose used in motivation must have two characteristics: (*a*) it must be one for the value of which the pupil has already developed an appreciation, and (*b*) it must be one in the realizing of which the pupil meets some difficulty that may be overcome by the means of control about to be taught. The purpose cannot function in the pupil's experience as a motive, it cannot be a purpose for him, unless he appreciates its value. Since the meaning of a thing is its use,[1] he cannot understand the new means of control which is to be taught unless he sees its use in overcoming some difficulty in the attaining of a purpose.

Since the meaning of a thing is its use, the motive, in order to develop a normal meaning, should be one in the service of which the new means of control is normally used. The motive, in other words, should give the pupil an intrinsic rather than an extrinsic interest in the new means of control.[2] Not only does extrinsic interest lead, as we have learned, to abnormal meanings, but it does not make the pupil responsive to situations in the social life beyond the school, because it does not cause him to associate with the means of control he has acquired in school the purposes normally calling for them in the wider social life. He cannot hear the voice of these purposes, because, while under the guidance of abnormal motives in school, he has not been taught to recognize it.

The teacher can usually secure extrinsic interest more

[1] See pp. 114–115.

[2] For an explanation of the difference between intrinsic and extrinsic interest, see pp. 133–137.

easily than he can secure intrinsic interest. In order to find motives that give intrinsic interest, he must have an insight into the social purposes upon which the meanings of the things depend, and he must also discover which of these purposes the pupil appreciates. The dullest schoolmaster can use extrinsic motives, such as the pupil's desire to escape punishment or to secure an arbitrary reward; no great ability is required to find that every pupil responds to these motives. Consequently, fear of punishment was long used as a motive for learning, as is evident by the fact that the symbol of schoolmasters in the days of most inefficient teaching was a book and a bundle of switches.

Since the purposes which give motivation to the means of control included in the curriculum are those for the realizing of which these means of control are normally used, the way to determine what purposes should be used for school motives is to look into the world beyond the school and to find what purposes are served there by these means of control. Let us consider the application of this principle.

In many schools the motivation for reading aloud is extrinsic. The pupils are provided with copies of the same reading book. The teacher tells the class to turn to a certain page and calls upon William to read the first paragraph. William's motive for reading under these circumstances is to gain the approval of the teacher and to avoid the punishment which would result from a refusal to comply with the command of the teacher, or it may be that obeying such commands has, through school experience, become for him an end in itself. After William has read a paragraph, the teacher asks the other pupils to point out William's mistakes. Hands are raised and

fingers are snapped by pupils eager to tell the teacher that William mispronounced a word, neglected to pause at a period, failed to raise his voice at an interrogation point, etc. The pupils' motives here are to obey the teacher, to secure her approval, to show by criticizing William's reading that they are superior to him. The teacher next asks Sarah to show whether she can read the paragraph better than did William. Sarah, standing in the middle of the aisle with heels together and head erect, tries to excel her classmate. Sarah's motive is to excel in competition, a motive which in schoolroom practice has been second only to that of avoiding punishment.

If we apply the principle given above for determining what motives should be used, the extrinsic nature of the motives in the illustration becomes apparent. Looking into the world beyond the school for an example of reading aloud under normal conditions, do we find that a farmer subscribes for as many copies of the rural newspaper as there are members of his family, and then, when the family has gathered about the fireplace at the end of the day, that he gives to each member of his family a copy of the paper, commands all to turn to a certain page, and orders one of his sons to read the first paragraph of the editorials? Does he then ask the other members of the family to point out the mistakes made by the son, and later require one of his daughters to try to read the first paragraph of the editorials better than did her brother? As is evident from this illustration, the normal motive for reading is to give pleasure or information to other persons; it is not to attain the purposes represented in the schoolroom situation given above. The normal motive for pointing out and correcting mistakes is to

enable the reader to interest or to inform others as effectively as possible. With such a motive, the pupil welcomes criticism and tries to profit by it, and the pupils who criticize do so in the spirit of social coöperation rather than in that of individual competition.

Let us apply to the school spelling lesson the principle for determining what motives should be used. The spelling lesson is often given in connection with the reading lesson. After the pupils have attempted to memorize a list of words because the teacher has told them to do so, they write these words at the teacher's dictation. The teacher then indicates the mistakes in spelling and records the grades made by the pupils. The motivation throughout such an exercise is artificial and extrinsic. In life beyond the school the desire to spell correctly arises ordinarily in connection with writing, as in the case of writing a letter, rather than with reading, unless perchance one is reading proof. A person normally desires to spell, not because some one has commanded him to do so, but because he is not certain about the spelling of a word and wishes to become certain about it. Full intrinsic motivation would therefore require that the spelling experience arise out of the writing of something otherwise worth while. Even when a list of words is memorized and written from dictation, as in the illustration given above, the desire to become certain about the spelling of words can be secured if the teacher, instead of correcting the mistakes on the paper, indicates only that there is a certain number of misspelled words which the pupil should correct. The pupil will then look through the list until he comes to a word concerning the spelling of which he is not certain. In order to become certain with regard to the spelling of this word, he will then use

some means of control, such as rules for spelling. To the extent that this motivation is intrinsic, he will become sensitive to uncertainty about the spelling of words and, in seeking certainty, will improve his spelling even after his school training is over.

Under the guidance of the principle for determining what motives should be used, we can easily see that reading, spelling, and arithmetic should get much of their motivation in the school as *tools* for doing other work that is more directly in the service of social values. Literature, history, geography, manual arts, all furnish opportunities for the use of these tools. In the case of a younger pupil, play affords intrinsic motivation by leading the child to use subject matter in normal ways. He may, for example, learn arithmetic, spelling, etc., in playing games felt to be worth while in themselves, or in imitating adults at storekeeping or housekeeping.

This incidental teaching of reading, writing, and arithmetic does not mean that drill should be precluded. The pupil must drill in order to become skilled in the use of these tools, if his purpose is to be realized. Interest in control becomes intrinsic when the pupil seeks control for the sake of improving his ability to attain other values that are normally sought. He feels that he cannot play the game satisfactorily or do some valuable kind of work unless he has acquired the proficiency afforded by drill. He does not drill because the teacher commands him to do this, but because activities of social value command him.

Motivation is the most critical step in the teaching of a control lesson, because it determines the nature of the pupil's self-realization, or development, under the direction of the school; what his motive is that will the pupil

be also, if the means of control are available. In this step the school finds its highest salvation only when it loses itself in the service of normal social values. The pupil should be trained to follow the guidance of normal purposes which arise from the situations that are not peculiar to the school but belong to the wider social life. If the school creates situations peculiar to itself in which the authority of the teacher is substituted for the purposes of social life, the training received therein fails to make the pupil efficient, because, not being taught to recognize and follow these purposes, he is without guide when the teacher no longer directs him.

(2) The second step in teaching a control lesson is leading the pupil to locate the difficulty; or, in other words, to define the problem. This should be done by making hypotheses on the basis of the analogy between this difficulty and some other which the pupil has located in a similar situation, and by testing these hypotheses either in thought or in action, or in both thought and action. In the case of reading aloud, for example, the pupil may feel a difficulty in attaining his normal purpose, if he finds that his hearers have not been interested in his reading. His desire to give entertainment or information is thwarted by some obstacle. In order to realize his purpose he must first find out definitely what this difficulty is. He begins to make hypotheses under the guidance of analogous situations with which he is familiar. As a listener he has found his own interest lagging when the reader spoke too rapidly or too slowly, when his voice was too loud or too soft, when his enunciation was indistinct. Has he himself committed one of these faults? This question can be answered by testing his reading with respect to the various faults mentioned.

He may remember that he has been reading loudly and thus at once dispense with the hypothesis that he may not have made himself heard. In class work other pupils may help him in this process of making and testing hypotheses by offering in the spirit of coöperation criticisms of the reading which may occur to them.

The difficulty in defining the problem is, as has been learned, in making the hypothesis. The teacher should assist the pupil here if it is necessary. The assistance should not, however, be given by telling him directly what the fault is, but by suggesting to him the analogous situations which will lead him to make an hypothesis defining the difficulty. In making this suggestion, the teacher may call the pupil's attention to situations in which the pupil as listener experienced and defined a similar difficulty when another pupil was reading. When the pupil finds the nature of the difficulty, his problem is to overcome it in his own reading.

The presentation through suggestion of the hypothesis which locates the difficulty is well illustrated by the way in which a teacher conducted an English composition lesson designed to give the pupils an understanding of the fundamental image in description. A boy was reading before the class a description which he had written. His essay did not attain its object because the hearers could not form a mental image of that which he had attempted to describe. In trying to assist the writer to locate his difficulty, the other pupils could go no further than to say that the description was confusing. The teacher then offered assistance by exposing for only a moment the picture of a building and by asking the members of the class to tell what they saw. They could give only the general form of the building without details. When

the teacher suggested that there was some similarity between forming a mental image through seeing a picture and forming a mental image through hearing a description, the pupils on the basis of this analogy easily made the hypothesis that perhaps the description should give a general view first and the details later. This hypothesis was tested, it may be added, by applying it to the boy's description. In this case the hypothesis appeared to be correct as the description was found to give no general view but to present only details. The truth of the hypothesis was still further tested when at the suggestion of the teacher the pupils examined some of Hawthorne's descriptions and found that this effective writer gave a general view at the beginning of each description. The teacher then told the class that the technical name for the general view is *fundamental image.* The pupil's next problem was how to present a fundamental image of the object which he was attempting to describe.

(3) The third step in teaching a control lesson is to lead the pupil to solve the problem. This should be done by making hypotheses on the basis of the analogy of the problem with some other similar problem a solution for which the pupil knows, and by testing these hypotheses in thought or in action, or in both thought and action. As the hypothesis is based on analogy, the teacher can save much time and useless thought on the part of the pupil by suggesting the basis of the hypothesis in the previous experience of the pupil. Then the latter can make the leap from the known to the unknown. Unless the pupil does proceed from the known to the unknown on the basis of analogy, he cannot acquire the new truth which the lesson is intended to teach him. He may commit to memory and repeat words which symbolize the

new meaning, but he does not understand the new meaning itself. If the problem is to find why an apple drops from the tree to the ground, the teacher may call the attention of the pupil to the phenomenon of a piece of iron being attracted to a magnet. Through analogy the pupil can then make the hypothesis that perhaps the earth attracts the apple as the magnet attracts the piece of iron. If the problem is to find why the moon does not fall to the earth, the teacher may suggest the phenomenon of the pull which one feels when one swings in a circle a stone attached to a string. The pupil then makes the hypothesis that perhaps the circular motion of the moon about the earth may cause a pulling away that counteracts the force of the attraction between the two. If the problem is to find what causes evolution, the pupil's attention may be called to selective breeding in the case of animals and to the fact that competition for food and other forms of the struggle for existence act as selective factors in the case of living things. The pupil is then ready to make the hypothesis that perhaps these natural selective forces eliminate the unfit and leave the fit to transmit their traits to offspring. If the problem is to get a general notion of the nature of an adverb, the pupil may find a suitable analogy if his attention is called to the nature of the adjective, which the adverb resembles in function as a modifying part of speech. The pupil then makes the hypothesis that the adverb is like the adjective except that it modifies a different class of words. Good examples of the solving of religious problems on the basis of analogy may be found in the parables given in the Bible.

When the pupil has formed an hypothesis, the teacher may assist him in testing it by calling attention to that which will invalidate a false hypothesis or sustain a true

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(4) The fourth step is the us
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It will be noticed that in the illustrations no one lesson is carried through all four steps. In this connection it should be remembered that the knowledge of the nature of the steps is for the sake of helping the pupil where his learning process meets with some check.[1] In some lessons the chief difficulty is with motivation; in others, with defining the problem; in others, with solving the problem; and in others, with using the solution. In the case of drill, strong motivation is needed; if the pupil has had previous experience in drill, he needs no further guidance. In the case of the teaching of the fundamental image, the chief difficulty was with defining the problem. When the pupil found that his essay was at fault because he did not use a fundamental image, he could probably solve, without the assistance of the teacher, the problem of what sort of fundamental image he should give in his essay. The chief difficulty in teaching the nature of gravitation is to solve the problem. If the motivation is strong, the use of the solution in attaining the purpose will naturally follow. The chief function of the teacher here is to simplify the situation by precluding difficulties that would confuse the pupil with further problems before he has realized his purpose. When, for example, the object of the lesson is to teach the use of the fundamental image, the teacher should not permit criticisms of various faults in the pupil's essay such as lack of unity in paragraphs, awkward forms of expression, loose sentences, etc. The way should be open for overcoming a single difficulty at a time.

[1] See p. 390.

VI

In the teaching of control subject matter, the methods that should be used in the study, the review, and the examination lessons depend upon the steps in teaching explained in the preceding section.

Let us now consider the study, review, and examination lessons in the teaching of control subject matter.

Since in the study lesson the pupil for the time being directs his own learning, the teacher must anticipate the difficulties which the pupil will meet and, in assigning the lesson, give whatever assistance is necessary to enable him to overcome them. The less able the pupil is to guide his own study, the more definite and detailed the directions given in the assignment must be. When the pupil understands clearly how to study the lesson, he saves time and energy and is not so liable to meet with discouragement.

The first step in assigning a study lesson is to give the pupil an intrinsic motive for study. This step may be supplemented by suggestions as to how he should conduct his study, in order that he may find the problem which the lesson undertakes to solve and the solution afforded for this problem. If more detailed guidance is necessary, the teacher may call the pupil's attention to whatever is necessary to assist him in private study to solve the problem, including references to books that will give the pupil assistance in his work.

The pupil should be taught how to study books and articles with the greatest economy and profit, since these usually are the guides upon which the pupil must depend for learning when the teacher is not with him. In order properly to present control subject matter, a book

should set and solve some problem. This problem is often expressed in the title of the book as, for example, Professor Dewey's *How We Think*, Professor Moore's *What is Education?* Professor McMurry's *How to Study*, and Spencer's *What Knowledge is of Most Worth?* Often the title of a book or article merely implies a problem. Spencer's essay entitled *Moral Education* undertakes to solve the problem, What is the nature of moral education? Professor Dewey's *Interest in Relation to Training of the Will* undertakes to solve the problem, What is the relation of interest to the training of the will? Professor Charters' *The Teaching of the Common Branches* undertakes to solve the problem, How should the common branches be taught? In examining a book or an article, the pupil should first find what is the main problem considered. If this problem is such that the content promises to solve one of his own problems, the book or article becomes intrinsically interesting to him.

The author of a book must divide his main problem into minor problems in presenting the solution of it. To each of the more important of these minor problems a chapter may be devoted. In the second chapter of his book *How to Study*, Professor McMurry, recognizing that study involves thinking, analyzes the complete process of study into the following factors: the finding of specific purposes, the supplementing of thought, the organization of facts collected, the judging of the worth of statements, memorizing, the using of ideas, the tentative attitude, and provision for individuality. One by one the subsequent chapters deal respectively with how each of these factors is related to study. Professor Dewey simplifies the solution of the problem of what is the relation of interest to the training of the will by considering what

educational theory, psychology, and philosophy have to say about it, and then what conclusions should be made in the light of this information. A book which does not indicate directly or indirectly the relation of the problems of the several chapters to the main problem lacks unity and is in that respect poorly written. The problem of the chapter may in turn be simplified by subdividing it into the minor problems that are solved in the sections or paragraphs.

The answer to the minor problem which a chapter or paragraph undertakes to solve is the key sentence. This answer is the *essential point* of the chapter or paragraph. The relation of the minor problems to the larger ones and of these to the main problem of the book or article reveals the relation of the essential points one to another. The problem of the preceding paragraph, for example, is, How does an author present the solution of the problem of his book? The answer is the key sentence, "The author of a book must, in presenting the solution of his main problem, divide the latter into minor problems." The rest of the paragraph makes the meaning of this key sentence more explicit by showing that the chapters and paragraphs constitute the solutions of the minor problems.

In the case of control subject matter, the review lesson should give especial emphasis to the organization of the truths that have been studied. These truths are properly related through the relation of the problems which they solve. A course or the subdivision of a course over which the review lesson extends has its main problem, to which the main truth of the course or of the subdivision is an answer. In the process of the solution this main problem has been subdivided into minor problems, and

these in turn have been still further subdivided. In this interrelation of problems we have the connections which hold the truths in their proper relationship, — not only those truths which are the solutions to the larger problems, but also those which are the solutions of the simplest problems into which the larger ones have been subdivided. If the pupil reviews facts only as independent truths or if he organizes them in some arbitrary way, he fails to grasp the truths in that normal organization which is not only the most useful way for holding them in mind ready for application, but also the most economical way for understanding and retaining them.

In the examination lesson, the most effective way for testing whether a pupil has acquired a means of control is to put him in a situation which calls for the use of it. This method furnishes an adequate test of the pupil's knowledge, because the meaning of a thing is its use. If the pupil is asked merely to reproduce statements of the truths which he has learned, he may reproduce remembered symbols the full meanings of which he does not understand even though he gives remembered illustrations of them; but when he applies the truths in situations that normally call for their use, the memory of symbols cannot take the place of the understanding of meanings. This fact is generally recognized in the case of mathematics, where the pupil is required to use in the solving of problems the truths learned; it should be recognized in the case of all kinds of control subject matter. An examination lesson of this kind is a valuable educational exercise as well as a test of the pupil's ability; every time a pupil uses a means of control, he acquires a more effective grasp of it.

VII

Important perversions of teaching are (1) the use of extrinsic motivation, which gives abnormal meanings; (2) telling, which is liable to neglect important steps in teaching; (3) the overemphasis of memory work, which interferes with the acquiring of purposes and ideas; and (4) the confusion of appreciation and control lessons, which results in the use of a type of method not adapted to the subject matter.

Important perversions of the methods of teaching are (1) the use of extrinsic motivation, (2) telling, (3) the overemphasis of memory work, and (4) the confusion of appreciation and control lessons.

(1) We have considered the nature and disadvantages of extrinsic motivation.[1] Although in the degree that extrinsic motivation is used the pupil acquires perverted meanings, the use of extrinsic motivation is sometimes necessary, because under present educational limitations the teacher may not be able to devise situations that will appeal wholly to intrinsic motives. The teacher should make it a rule, however, to use the most intrinsic motivation possible under the circumstances.

(2) Telling is liable to leave missing links in the process of learning. In the case of purpose-giving subject matter, the teacher is often tempted to tell about the values presented instead of putting the pupil in the situation where he feels these values. When this is done, the link which should connect the values intended to be presented with the pupil's acquired appreciations that would enable him to feel them, is missing. The teacher is tempted to tell also the connection between the value which the pupil should appreciate and the new means to which this value should be transferred, as when in literary study he repeats the moral of a work of lit-

[1] See pp. 133–137.

erary art. When this is done, the rational attitude involved in listening to a statement of a moral does not enable the pupil to make the transfer of value to the new means which is intended to receive it. He does not even feel the value. He may learn the words of the teacher and be able to talk about the subject matter, but he has not acquired the new appreciation for which this subject matter is normally a guide. When with the assistance of the teacher the pupil himself goes through the process for making new purposes or that for making new ideas, his difficulties reveal exactly what the teacher should do in assisting him, but when the pupil is told, there may be gaps in the learning process which the teacher can hardly discover.

In the case of control subject matter, one important link which telling often neglects is that which connects the known with the unknown. Telling may not provide for the analogies which connect previous experience with the hypotheses that locate and solve the problem. To the extent that the pupil does not reach an hypothesis through its analogy with some known fact, he fails to understand the meaning of this hypothesis. After the teacher has told him, he may repeat the words that symbolize it; but he has not necessarily acquired a true understanding of the meaning of these words.

Another link needed which telling is liable to neglect is that which connects the hypotheses with the facts that should be used in testing them. If, instead of calling the pupil's attention to the facts that test his answer to the problem, the teacher tells him that the answer is right or wrong, the pupil tests it by the teacher's acceptance or rejection rather than by the facts that should be used to test it.

If the teacher merely tells facts without even presenting a problem to the pupil, he neglects giving intrinsic motivation and affording opportunity for the pupil to use the new truth presented.

(3) When a pupil feels strong values and associates with them means for their realization or when he experiences problems and solves them, memory is a by-product of the process of learning. The best way to memorize a selection of literature, for example, is to read it with understanding and appreciation.[1] The best way to memorize control subject matter is through forming and solving problems. In view of this fact, the teacher need not make the pupil try to memorize. If the pupil tries to memorize, he is concerned with the difficulty of memorizing rather than with the difficulty of controlling some value for the sake of which the subject matter should be used. The attention upon memorizing, therefore, diverts attention from that which gives true value and meaning to what the pupil is learning.

(4) A failure to understand the differences between purpose-giving subject matter and control-giving subject matter sometimes leads the teacher to apply the wrong method to the teaching of one or the other. The writer once heard an astronomy lecture in which the teacher, using the steps necessary to develop appreciations, presented the scientific material as though it were poetry. He aroused feelings of worth by calling attention to the immensity, harmony, and beauty of the universe, and then with this appreciated value associated God as the Author of it all. This led to the transfer of the feeling of value aroused to the idea of God. The class was left with a vague understanding suffused with emotion. The

[1] See Pyle, W. H., *The Outlines of Educational Psychology*, p. 193.

scientific subject matter, which was devised to give an understanding of the relations of the heavenly bodies, did not function properly in this class, because the proper method was not used. If the teacher desired to give a greater appreciation of the Author of the Universe, he should have taken for his lesson some work of literary art formed by a genius for this very purpose. He might have taken for his subject, "The heavens declare the glory of God; and the firmament sheweth his handiwork," and used the *Nineteenth Psalm* as the subject matter for the lesson. Since this psalm was fashioned by a literary genius for the very purpose of giving a new appreciation of God, it would have given better results so far as the appreciation is concerned. A modern textbook on astronomy is written from the scientific point of view as an instrument for giving knowledge rather than appreciation. The waste of energy when control subject matter is taught as purpose-giving subject matter is due to the fact that the subject matter is not used in the way it is fashioned to be used.

At another time the writer heard a teacher of literature murder a literary selection by grammatical and rhetorical dissection. Instead of developing appreciations of value, she kept the attention of the class on scientific problems, thus teaching the purpose-giving subject matter as though it were control-giving subject matter. In assigning the advance lesson at the close of the recitation, the teacher, smiling with sweet confusion, said, "To-morrow, boys and girls, we shall take the life of Carlyle." They undoubtedly did!

A work of literature is written to give its readers a new purpose; it is not written to give new control. When this teacher by the use of the wrong method

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natural science correspond to the appreciation and the control lessons described above. One type of lesson is that which intimately connects brain paths already established with fundamental systems of reactions; the other is that which establishes new brain paths. In one case a new purpose is developed; in the other, a new means of control.[1]

For teaching an appreciation lesson, the function of which, according to the materialistic point of view, is intimately to connect previously acquired brain paths with fundamental systems of reactions, natural science presents three steps, which correspond to the three steps into which the process has been analyzed from the teleological point of view.

(1) The environment must be modified in such manner that it will give the stimuli necessary to cause the fundamental systems of reactions to function in the pupil's organism. These fundamental systems of reactions, such as those which form the physical parallels of aversion to suffering and death and of attraction to that which is loved, are usually strongly instinctive. If more than one system of reactions involving aversion begin to function through appropriate stimuli, the resulting tendency to aversion is strengthened; if more than one system of reactions involving attraction begin to function, the resulting tendency to attraction is strengthened. The teacher may assist in calling forth each system separately and then let the organism unite them. This is the physical counterpart of the development of strong feelings of value through analysis and synthesis in teaching purpose-giving subject matter. In the case of the *Twenty-Third*

[1] For a detailed discussion of these processes, see pp. 92–98 and 121–127.

Psalm, for example, the fundamental responses to the stimuli of green pastures, still waters, protection against enemies, etc., may be called forth individually. If the responses in the case of the pupil are not as strong as they should be, the teacher must modify the environment so that the stimuli will call forth the appropriate strong responses. These various responses, after having been excited by appropriate stimuli, may be combined as a single reaction to the complex stimuli from the environment.

(2) The next step is to make the reaction channel of *following the Lord*, for example, an integral part of these open channels by connecting it with them. This is the physical counterpart of associating with the value presented some means for its realization.

(3) The environment must be modified so as to cause the reaction of *following the Lord* to function in connection with the more fundamental reactions such as those towards green pastures, still waters, protection against enemies, and other stimuli presented by the psalm as a part of the environment. This is the physical counterpart of using the new means in realizing the appreciated value.

In teaching a control lesson, (1) the first step on the mechanical side is to modify the environment so that stimuli will call forth a response and at the same time will check this response in its functioning. Appropriate stimuli may call forth the reaction of reading; but, if the reading is defective, the reactions of other organisms affected by the reading excite in the pupil responses which interfere with the reading. This step corresponds to the teleological step of developing a motive which involves the pupil in some difficulty.

(2) Reactions must now be directed towards the several parts of the situation until checked more specifically by the disturbing factor. This factor constitutes a part of the situation for which no adequate response has been acquired. The teacher may assist here by modifying the environment so as to give the stimuli necessary to make the pupil react to the specific obstruction. Such assistance may be afforded by giving stimuli which on other occasions have brought approximately the reaction needed. This tends to open a channel of response that is adapted to the situation. In the case of a reading lesson, the teacher may imitate the pupil's fault, thus opening a channel of response on the part of the pupil that will function in directing his reaction against the difficulty in his own reading. If the pupil, for example, reads in a monotone, the teacher, by himself reading in a monotone, may start in the pupil a reaction that will point to this fault. This step corresponds to the teleological step of defining the problem through hypotheses and testing the hypotheses in thought or in action. Incipient reactions appear on the side of consciousness as hypotheses. They are tested by action when they are fully carried out, and by thought when they are measured only by the immediate effects they produce in the nervous system before overt response appears.

(3) The response should then be turned towards overcoming the check. The teacher can do this by modifying the stimuli so as to open the channel to the response which will overcome the obstruction. In the study of gravitation, the pupil may be made to react as desired towards the stimuli of an apple falling to earth, if the teacher first opens the appropriate channel by having him react towards the stimuli of a piece of iron attracted by a magnet. This

step corresponds to solving the problem by hypothesis tested in thought or in action, or in both. The incipient reactions which have been directed to the point of difficulty are the counterparts of hypotheses and of the testing of hypotheses in the solving of a problem. The hypothesis is tested in thought, if it is tested by the immediate effects produced in the nervous system before an overt response appears. In testing the hypothesis, the teacher modifies the environment so as to give stimuli that will inhibit or strengthen the incipient reaction of the pupil at the point of obstruction.

(4) The checked reaction must be completed through the new pathway of response developed by the situation. This corresponds to using the means of control in attaining the purpose. The teacher may assist here by removing obstructions that would present difficulties complicating the reaction unnecessarily, and thus enable the pupil to overcome one difficulty at a time.

The evidence of natural science supports in a convincing way our conclusions with regard to extrinsic motivation, telling, undue emphasis upon memory work, and the confusion of appreciation and control lessons.

In the terms of natural science, extrinsic motivation means the development of reactions in response to stimuli not normally producing these reactions. In the case of extrinsic interest in reading explained above, the pupil responded to the stimuli of the teacher's voice instead of to the stimuli of other human organisms that would in turn react favorably to his reading. Training under such abnormal situations fails to make the pupil responsive, in the absence of the teacher, to the situation that normally brings the response of reading. In the degree that the situation is abnormal, the response is abnormal; and in

the degree that the response is abnormal, the meaning which parallels it is perverted.

Natural science shows that memorizing, which is the parallel of fixing reactions in the nervous system, should ordinarily be a by-product in education. It explains that reactions are fixed normally in the nervous system merely by being performed. To the extent that the individual does anything else than perform the reaction he is, of course, fixing the modified form of the reaction, which may be so different from the normal reaction as not to retain any of its essential characteristics. This is true when the organism reacts by reproducing symbols instead of by performing reactions for which these symbols stand. If the individual does not perform the reactions for which the symbols stand, he fails to acquire the true meanings of these symbols because the meaning of a thing symbolized parallels the reaction to it.

In telling, the teacher undertakes to develop connections in the nervous system of the pupil through the stimuli of words without direct evidence of just what guidance is needed for the development of the nervous system. If the pupil is stimulated to begin the reaction necessary to make the new connections which he should acquire, the teacher can discover what guidance is necessary by noting where the process of acquiring the new connections breaks down. The pupil must have assistance to overcome these difficulties, but he needs no other assistance than this. When, by the stimuli of words, the teacher undertakes to guide the development of nerve connections without knowing the breaks in the pupil's process of acquiring new connections, he is liable to omit important directions which the pupil should have. If these directions are omitted, the pupil does not acquire

the proper nerve connections and consequently does not get the proper appreciations and meanings.

According to natural science, the teacher who confuses appreciation with control subject matter uses environmental conditions provided by the curriculum in an abnormal way and therefore does not get the satisfactory results that can be secured when they are used normally.[1] History and the fine arts are effective guides for modifying the pupil's nervous system in such manner that particular responses are connected with fundamental systems of reactions; but, if the teacher uses this subject matter to develop new reactions, the results are unsatisfactory, because the subject matter is not fashioned as a guide for developing new reactions. On the other hand, the sciences are effective guides for modifying the pupil's nervous system in such a manner that new reactions are acquired; but if this subject matter is used by the teacher to connect responses with fundamental systems of reactions, he uses it as a means of doing that for which it is not well adapted. The teacher obviously gets better results by using the subject matter to do that for which it is especially adapted.

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[1] Cf. pp. 195–196.

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PROBLEMS

1. Is it desirable that an elementary school teacher know the home life of her pupils? Why?

2. Make a lesson plan for teaching some particular lesson in history.

3. *a.* What in your judgment are the most common defects in Sunday school teaching? *b.* What suggestions would you make for overcoming these defects?

4. Why is it important that a teacher enjoy a poem or other work of art he is teaching to a class?

5. If a teacher believes that appreciation is an end in itself and not related to action, what is the most serious error he is liable to make in teaching poetry?

6. Should the teacher tell the class directly the moral of a story? Explain.

7. Make a lesson plan for the teaching of some poem and indicate in the plan the essential steps in the teaching of purpose-giving subject matter.

8. Make a lesson plan for the teaching of some picture and indicate in the plan the essential steps in the teaching of purpose-giving subject matter.

9. A teacher required his pupils to commit to memory the more important rules for punctuation and then dictated to them a number

of sentences to be punctuated in accordance with these rules. Criticize his method of teaching.

10. What should be the relation between classroom work and laboratory work in the teaching of some physical or biological science?

11. What is probably the main defect in the teaching of control subject matter, if the pupils seldom ask questions?

12. What fault would you find in a lesson assignment that indicates merely what pages the pupil should read in the textbook?

13. In assigning collateral reading, is it better for the teacher to ask the pupil to make an outline of what he reads or to report the important ideas in the reading that are new to him? Explain.

14. Would it be advisable for a teacher in assigning a review lesson of miscellaneous problems in arithmetic to tell the pupils the rule involved in the solution of each of the problems? Explain.

15. How would you develop in children the ability to think for themselves?

16. How would you answer the objection that, in view of the amount of work to be covered in a course, it would take too much time to give the pupil a motive for each lesson, and to lead him to make and test hypotheses in defining and solving his problems?

17. Mention some high school subject you have studied with intrinsic interest predominating and some high school subject you have studied with extrinsic interest predominating. Which subject did you the more good? Why?

18. What are the relative values of competition and coöperation as motives for study?

19. *a.* What is meant by socializing classroom instruction? *b.* How could the methods in some school with which you are acquainted be more fully socialized?

20. Make a lesson plan for the teaching of some scientific truth and indicate in the plan the essential steps in the teaching of control subject matter.

21. Explain the function of the subject matter you are preparing to teach and state the methods you should use to make it function normally in the experience of the pupils.

22. Select a chapter from some textbook in science and tell what is the problem of the chapter and what is the problem of each section and paragraph.

23. *a.* How did you study Chapter XII in this book? *b.* Criticize your method of study in the light of Chapter XIII.

24. In what particulars do you believe that you can improve your methods of study?

25. What evidence can you give that you are able to study more independently now than you were two years ago?

26. Do you believe that the students who rank highest in daily work in a high school or college course should be excused from examinations? Give reasons for your answer.

27. Compare the analysis of the learning process given in this chapter with the analysis of study given in *How to Study and Teaching How to Study*, by F. M. McMurry, pp. 15–23.

28. Why is the lecture method not suited to high school pupils?

29. How should the methods of teaching in a secondary school differ from those adapted to university students?

30. How should the methods of teaching in an elementary school differ from those adapted to high school pupils?

CHAPTER XIV

EDUCATIONAL DEVELOPMENT

The problem of this chapter is to find the general nature of the development of education as a rationalized endeavor. In the rationalization of education, the following subjects have arisen: History of Education, School Administration, Supervision of Instruction, School Hygiene, Theory of Teaching, Educational Psychology, Principles of Education, and Philosophy of Education. The function of each of these subjects and the relation of each to the other fields of educational investigation should be definitely recognized. The progress of education is as unending as human development.

I

The problem of this chapter is to find the general nature of the development of education as a rationalized endeavor. This development has resulted primarily from efforts to overcome through education difficulties in the social order. The development of education, like that of other forms of institutional activity, has been irregular.

Educational activities, like all other social processes, develop through becoming rationalized. Difficulties in educational procedure are ever being discovered and overcome by careful thought. For the most part this thinking has been based upon mere opinion; but, with the application of scientific methods to the study of education, an accurate knowledge of the facts concerned has greatly increased the accuracy of the results attained in the solution of educational problems. A detailed statement of the development of education as a rational-

ized endeavor would constitute the history of education, which deals with the new educational purposes that have arisen from time to time and with the changes in practice that have been made in the service of these purposes. Our problem from the standpoint of the principles of education is to find the general nature of this development rather than the concrete details which comprise it. Since the educational process is essentially the same whether it appears in the school or in other institutions, where it is of secondary importance, our study of the development of education through rationalization may be limited to the work of the school, with which most of the study of education has concerned itself.

Men have, for the most part, defined the ideals and the methods of education when they have undertaken to use it for the sake of overcoming difficulties in the social order. When, for example, deep-set difficulties in the social order led to the problem of how a man should live in order to get the most out of life, Plato defined the educational ideal as knowledge, and gave an outline of the curriculum and the method which he believed would lead to the realization of this ideal. In answer to the conflict between individual interests and traditional social restrictions, Rousseau explained the ideal of education as individual development, and presented a scheme whereby he believed this ideal could be attained. When a difficulty arose because the practical demands of rapidly developing science conflicted with the traditional humanistic curriculum, Herbert Spencer devised important educational doctrine in attempting to solve the problem of what knowledge is of most worth. When a body of educational doctrine arising from various sources had been generally accepted, conflicts arose within the theory of education

itself. In reconciling such conflicts between the doctrines of interest and effort and between theories regarding the child and the curriculum, Professor Dewey made valuable contributions towards rationalizing education. In recent years much attention has been given to difficulties arising within the technique of education; and valuable results, due largely to the use of scientific methods in locating these difficulties and in devising means for overcoming them, have been attained.

The development of education has been irregular. Like other forms of institutional activity, it has passed through periods of development gradual, arrested, and revolutionary. Illustrations of this fact are given in the chapter on social development.[1]

II

In the rationalization of education, the History of Education prevents formalism and opens the way for scientific improvement of educational practices, School Administration solves the problems arising from the complex school organization, Supervision of Instruction presents the methods that should be used in improving and coördinating the teaching in the schools, School Hygiene deals with health problems peculiar to school conditions, the Theory of Teaching reveals the methods by which the learning process can be controlled, Educational Psychology presents from the educational point of view an objective scientific study of human nature, the Principles of Education afford general guidance in educational thought and practice by revealing the fundamental ideas which should regulate educational procedure, and the Philosophy of Education unifies the whole field of educational endeavor.

When, because of the growing complexity of educational practice, those engaged in educational work felt the need of guidance, they sought the *History of Education* in order to profit by the experience of the past, in

[1] See pp. 290–305.

which many thinkers had dealt with educational problems. Since educational classics were directly concerned with solving important educational problems and were easily accessible, these writings occupied the most prominent place in the History of Education. The appearance of new difficulties, — for later situations are different from those that have gone before, — and the development of scientific methods of investigation, led later educational thinkers to attempt to solve educational problems by a direct study of the facts themselves instead of depending upon the experience of the past. As new scientific subject matter dealing with educational practice was in this way worked out, the History of Education was not so much depended upon for guidance in educational control, because the greater value of the results of modern scientific investigations was easily recognized. A modern scientific treatment of the methods of teaching is a better guide for school practice than the theories of teaching advocated by Rousseau, Pestalozzi, and Herbart, or accounts of the methods used by old-time schoolmasters. A modern standard work on school administration is more useful as a guide in organizing schools than is Comenius's *Great Didactic* or accounts of school systems in past generations. Having been relieved of the responsibility of giving scientific guidance, for which it is not well adapted, the History of Education is now free to do the peculiar work in which it excels all other studies of education, — the work of revealing the purposes which underlie educational practices. It thus prevents formalism and opens the way for the scientific improvement of these practices.[1]

When the independent one-room school gave way to city, county, and state educational systems, the problems

[1] See discussion of the function of history, pp. 202–204.

of administration became correspondingly complex. The solutions of these problems formed the subject matter of the study of *School Administration*, which includes such problems as those connected with the educational activities of national and state governments; the management of city, county, and district school systems; the management of evening and continuation schools; the construction of schoolhouses; the selection of the course of study; the provision of textbooks and school supplies; the supervision of instruction; the education of subnormal and supernormal children; the regulation of attendance; the control of the morals of pupils; the administration of vocational and physical education; the grading and promotion of pupils; the financing of schools; and the preparing of school records and reports.

The *Supervision of Instruction*, which has to do with improving and coördinating the teaching in the schools, was done in the early days by laymen, who had no special training for this work. When, as schools became more highly developed, persons trained in education were needed for this work, it was transferred from laymen to the administrative officers of the schools. In the larger school systems, the work of supervising the instruction has become so extensive that it is assigned to officers who are specialists in this field. It is further organized by the special supervision of the instruction in such subjects as music, drawing, penmanship, and manual arts by persons specially trained for this work. The importance of supervision of instruction as a subject of study is such that it may be considered not only as one of the subdivisions of Educational Administration, but as a subject requiring special treatment coördinate with that of School Administration.

Some of the problems which come before the supervisor of instruction are how to articulate the kindergarten, the elementary, and the high schools; how to organize economically the work for each grade of school; how by measuring results and otherwise, to determine the abilities of teachers, so that each teacher who is retained in the service can be assigned the work he is able to do most effectively; how to lead the teachers to secure social rather than individualistic motives on the part of the pupils; and how to lead them to develop the pupils' interest, initiative, and industry.

Health problems arising from indoor life, the grouping of many children in one building, close application to books, the use of the smaller muscles in handwork, the unusual demand for inhibition, and other conditions peculiar to the school have led to the development of *School Hygiene* as important subject matter.

When men began to look upon the work of education not merely as disciplining the child by replacing his fickle interests and illogical thinking with the serious interests and logical thinking of the adult, but as guiding the growth of the child's experience in his development from infancy to maturity, the problems that gave rise to the *Theory of Teaching* became manifest. When motivation was secured largely by reward and punishment, and when learning was largely a matter of rote memorizing, men did not recognize the important problems of teaching; but when they began to understand that teaching is controlling the development of a very intricate child nature, they did recognize these teaching problems, which at once began to multiply. The Theory of Teaching now deals with both general and special methods, the one comprising the fundamental forms of procedure which

apply to all teaching and the other dealing with the application of these to special kinds of subject matter, such as history, language, mathematics, biology, and physics. In view of the fact that the methods of teaching are the forms in which the subject matter is presented and are therefore closely dependent upon the nature of the subject matter, the need for the study of special methods is important. The Theory of Teaching deals from the point of view of the teacher with such problems as the following: What is the function of teaching? What is the nature of subject matter? What is the difference between the logical and the psychological organization of subject matter? What is the function of the curriculum? What is the nature of the pupil the development of whom should be guided by the teacher? What use should the teacher make of the curriculum? What is the difference between the incidental and the systematic teaching of subject matter? What are the natures of the various kinds of lessons? How should lesson plans be made? How should motivation be secured? How should lessons be assigned? What are the best forms of questioning? How should the class be managed? How can the teacher give moral training? What are the influences of physical conditions upon the work of the pupils? How can the results of teaching be measured and tested? How should the work of teachers be supervised? In the case of special methods, the problems of teaching arise from the application of such questions as these to the teaching of particular kinds of subject matter. These problems have to do with the functions of history, language, biology, and of other particular subject matter to be taught; the motives by which the pupil should be led to study the kind of subject matter

with which the special method is concerned; the psychological as compared with the logical arrangement of particular lessons; etc.

Hand in hand with the Theory of Teaching, *Educational Psychology* has developed. Educational thinkers have found that not mere sympathetic insight into child nature produced by the teacher's imagining himself in the pupil's place, but an objective, scientific study of child nature is the only basis on which reliable methods of teaching can be developed. When Herbart recognized this fact, he developed a psychology as the basis for his theory of teaching. He found it necessary to devise the fundamental principles of psychology himself, because the only generally accepted psychological theory of his time was the Aristotelian, supporting the old idea of education as discipline and offering no satisfactory explanation of the way in which ideas are acquired. Since teaching is "causing the pupil to learn," the scientific analysis of the learning process is the first step in determining what should be the nature of the teaching process. Educational Psychology, which has kept pace with general experimental psychology in its development, reveals the bearing of the facts and principles of psychology upon the problems of teaching, and uses psychological methods in solving a wide variety of educational problems. It presents the educational implications of these facts and principles regarding such matters as instincts and habits, memory, attention, thinking, fatigue, the improvement of mental abilities by practice, and the influence of the improvement of one mental function upon other mental functions. It also furnishes a scientific technique for measuring abilities and establishing norms.

With the rapid development of educational thought,

some general guide was needed to mark the essential nature of education so that this essential nature would not be lost sight of in a confusion of details. There was need of principles to serve as general standards in judging the truth or falsity of educational ideas and practices, to provide a general basis for organizing ideas of the details of education, and, by revealing the true objectives of educational procedure, to indicate the problems requiring solution.[1] To meet this need, the subject matter of the *Principles of Education* has been devised.

The Principles of Education have for the most part been stated in the terminology of natural science and have therefore described the life process as the process of adjustment of the organism to the environment. In some books on this subject, the point of view of teleology and that of natural science have been used without being differentiated. This lack of differentiation is liable to lead to erroneous ideas resulting from a confusion of the personal subject with the organism and of the objective aspect of experience with the environment. The difference between the explanation of human life afforded by natural science and that afforded by teleology, and the danger of confusing these explanations, are presented in previous chapters of this book.[2]

Some of the important questions which various books on the Principles of Education have undertaken to answer are as follows: What are the educational implications of the theory of evolution? What is the nature of social development? What is the relation of the individual to society in the process of education? What is the aim of education? What agencies other than the school educate? What is the function of the school? What

[1] See pp. 1–5. [2] See pp. 6–13 and 65–66.

are the functions of elementary, of secondary, and of higher education? What is the nature of educational value? What are the educational values of the sciences and of the humanities? What is the difference between liberal and vocational education? What are the criteria for selecting the curriculum? What are the psychological bases of teaching? What powers and capacities should be recognized in educational procedure? What are the conditions of individual development? To what extent does the improvement of one faculty through use affect the improvement of other faculties? How should the school be organized in order to realize most effectively the aim of education?

A number of conflicts of a very fundamental nature have arisen in the field of educational study. The *Philosophy of Education* is the court of final appeal in reconciling these conflicts, and accordingly tends to unify the whole field of education. The Philosophy of Education carries with it a general attitude towards all educational endeavor, because it deals with fundamental ideas, or plans of action, that are concerned with this activity. In general, the Philosophy of Education bears to the Principles of Education a relation similar to that which philosophy bears to a science. Its function is to make a systematic inquiry into the fundamental nature of the presuppositions upon which the Principles of Education are based. As MacVannel says:

> The aim of the philosophy of education may be variously stated: (*a*) to discover the place and significance of education in human experience; (*b*) to furnish a systematic interpretation of the presuppositions and results of educational experience; (*c*) to furnish a progressive organization of the principles presupposed and ascertained by the sciences in their relation to educational experience;

(*d*) to trace the relations of education to the other activities of civilization; (*e*) to determine the relation of the educational process to the process of reality; (*f*) to become the theory of the nature and development of educational experience; (*g*) to become the system or organization of the principles of education.[1]

Some of the more important problems considered in the Philosophy of Education are as follows: What is the meaning of education? Is a science of education possible? What are the factors of the educational process? What important implications does the theory of evolution have for educational theory? What are the nature and the meaning of environment? What is the difference between the physical and the social environment? What is the aim of education? What is the nature of educational value? What is the relation of mind to body? What is the nature of experience? How does experience develop? What is the relation of knowledge to virtue? What is the relation of theory to practice? What is the nature of personality? What is the relation of the individual to society? What is the nature of human institutions? What is the relation of education to social progress? What should be the essential characteristics of education in a democracy? What is the relation of subject matter to method? What is the essential problem of the methods of teaching? What are the relative values of interest and effort in learning? What is the essential problem of the curriculum?

The lists of questions here given as examples of the characteristic problems with which various divisions of the study of education are concerned appear not to be mutually exclusive, but to overlap. To a considerable

[1] MacVannel, J. A., *Outline of a Course in the Philosophy of Education*, p. 16.

extent this overlapping is only apparent, because similar questions, when considered from different points of view, involve different problems. It is true, however, that the various fields of educational study have not been clearly differentiated by investigators.

III

The progress of education requires further development of the History of Education, Educational Administration, Theory of Teaching, and the like. The function of each of these subjects and the relation of each to other fields of educational investigation should be definitely recognized. The progress of education is as unending as human development.

Whatever general advance is made in education must be made as the result of further rationalization of the educational process. Such advance requires that educators know more definitely what they are trying to do and devise better means for accomplishing these aims. In this process of rationalizing educational procedure, the History of Education reveals the purposes underlying educational practices; Educational Administration deals with the many problems that arise from the complicated organization of educational forces; Supervision of Instruction presents the methods that should be used in improving the work of the individual teachers and in securing more effective coöperation among the various teachers employed in the same school system; School Hygiene deals with health problems peculiar to the school; the Theory of Teaching shows how the learning process of the child should be directed; Educational Psychology finds the natural endowments of human beings in so far as these endowments may be used in education, analyzes the learning process, and employs the technique of natural

science with its exact measurements and mathematical methods to solve many other related educational problems; the Principles of Education give general guidance in educational thought and practice by revealing the fundamental ideas which should regulate educational procedure; the Philosophy of Education as the last court of appeal in solving conflicts in educational thought, unifies the whole field of educational endeavor. This list of subjects which rationalize educational practice is not intended to be exhaustive. It represents, however, the more important subdivisions of study in this field of human activity.

Sometimes the educational subject matter here mentioned is divided into cross sections, so that elementary, secondary, and higher education are studied separately. These cross sections do not conflict with the divisions of educational subject matter here given, because elementary, secondary, and higher education each presents peculiar problems that may be studied from the point of view of history, administration, teaching, psychology, and the like. These cross sections are an advantage, because, by subdividing the field of education, they simplify and more clearly define its problems.

At present the main classes of educational subject matter overlap to a considerable extent. Attention was called to this fact in the preceding section in the case of lists of questions given to indicate the present scopes of various divisions of the study of education. This fact is revealed, moreover, by a comparison of the contents of textbooks and of syllabi of courses dealing ostensibly with different fields of educational study. The overlapping is due to the failure of various investigators to recognize the limits of their respective fields, largely because these

fields are new and have been developed to a considerable extent independently of one another.

Educational investigation should be more definitely organized. Each division of the field, such as the History of Education, Theory of Teaching, Educational Psychology, and the Principles of Education, should have a definitely recognized function in contributing to the rationalizing of educational procedure and a definitely recognized relation to the other special fields of educational investigation. The greatest economy and efficiency in educational investigation requires that each worker recognize the purpose and limitations of his own special field and that he coöperate intelligently with other investigators in different fields.

The development of education is as unending as human development, of which we have found it to be one of the factors. The educational problems we have attempted to outline live on, but the particular formulations and solutions of these problems change as the study of the individual reveals more definitely his nature and as changing civilization sets new patterns to guide the progress of the human spirit.

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PROBLEMS

1. Make a list of the more important educational periodicals and state the special field of each in the discussion of educational problems.

2. Make a list of the titles and authors of thirty books on education, including not less than two books representative of each of the eight special fields of educational study defined in this chapter, and state the special field to which each book is mainly devoted.

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